



# **Final Draft Environmental Assessment**

**for**

**Repairs and Replacement of Overhead Electrical  
Line, Feeders N1, N3, and N6  
Vandenberg Air Force Base,  
California**

**22 August 2011**

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>22 AUG 2011</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2011 to 00-00-2011</b>	
4. TITLE AND SUBTITLE <b>Final Draft Environmental Assessment for Repairs and Replacement of Overhead Electrical Line, Feeders N1, N3, and N6 Vandenberg Air Force Base, California</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Science Applications International Corporation, 5464 Carpinteria Ave, Suite K, Carpinteria, CA, 93013</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>106</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



## **FINDING OF NO SIGNIFICANT IMPACT**

### **Repairs and Replacement of Overhead Electrical Line, Feeders N1, N3, and N6 at Vandenberg Air Force Base, California**

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 United States Code (USC) 4321 to 4270d, implementing Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR Part 989, Environmental Impact Analysis Process, the U.S. Air Force (Air Force) assessed the potential environmental consequences associated with repairing and replacing an aging overhead electrical line, Feeders N1, N3, and N6, on Vandenberg Air Force Base (VAFB) in Santa Barbara County, California.

These repairs and replacements are needed because existing conditions do not provide a reliable power source required to support launch operations on south VAFB. If these electrical lines are not repaired and replaced, electrical supply to VAFB's Space Launch Complexes (SLCs) may fail. If such failure happens during mission-essential operations, e.g., space launch preparations and space launches, key national defense missions may be delayed. This could negatively impact the United States' security and safety.

The Environmental Assessment (EA), incorporated by reference into this finding, analyzes the potential environmental consequences of activities associated with repairing and replacing overhead electrical line, Feeders N1, N3, and N6, and provides protective measures to avoid or reduce adverse environmental impacts. The EA considers all potential impacts of Alternative A (the Proposed Action), Alternative B (the Realigned Alternative), and the No-Action Alternative. The EA also considers cumulative environmental impacts with other projects at VAFB.

#### **ALTERNATIVE A (PROPOSED ACTION)**

The Proposed Action includes demolishing existing electrical lines and constructing new overhead electrical lines and access roads. Approximately 94,900 linear feet (20 miles) of existing overhead electrical lines would be replaced with approximately 55,500 linear feet (11 miles) of new lines on the southwestern portion of South VAFB. The new overhead electrical lines would be adjacent to existing roads to the extent feasible, thus providing easy access and facilitating regular maintenance. In areas where new feeder alignments cannot be located near existing roads, access roads would be established. To prevent electrical service interruptions on South VAFB, the existing lines would remain operational until installation, testing, and initial operation of the new lines is completed. After the new lines are working properly, the existing lines (i.e., wires, electrical equipment, and poles) would be removed. The new overhead electrical lines would be inspected annually and maintained.

#### **ALTERNATIVE B (REALIGNED ALTERNATIVE)**

Alternative B is the same as Alternative A (Proposed Action), except that a portion of the new overhead electrical lines would be realigned to avoid sensitive archaeological resources. Under Alternative B the following portions of Feeder Lines N1 and N3 proposed under Alternative A would be realigned to avoid sensitive archaeological resources: 1) two new poles located on the southeast corner of the Tow Route west of Sudden Road would be relocated within the Tow Route road berm 120 feet south of the existing power poles; and 2) two poles located east of Coast Road would be relocated east of the existing paved access road.

#### **NO-ACTION ALTERNATIVE**

Under the No-Action Alternative, the Proposed Action would not occur and mission operations on south VAFB would continue to be subject to unexpected delays due to powerline failures. This alternative would not provide a reliable power source required to support launch operations on south VAFB.



## **SUMMARY OF FINDINGS**

The analyses of the affected environment and environmental consequences of implementing the Proposed Action presented in the EA concluded that by implementing environmental protection measures, no significant adverse effects would result to the following resources: air quality, greenhouse gases (GHGs), biological resources, geology and earth resources, land use and coastal zone resources, noise, public health and safety, transportation, visual resources, and water resources. On these resources, no significant adverse cumulative impacts would result from activities associated with Alternative A (Proposed Action) or Alternative B (Realigned Alternative) when considered with past, present, or reasonably foreseeable future projects at VAFB. In addition, the EA concluded that the Proposed Action would not affect environmental justice, socioeconomics, public services and utilities, and recreation.

The Air Force determined that implementing Alternative A (Proposed Action) would result in adverse direct and cumulative impacts to two archaeological sites eligible to the National Register of Historic Places (NRHP). Therefore, the Air Force developed Alternative B (Realigned Alternative) to avoid the two archaeological sites by changing the course of the new power line route.

### **Cultural Resources**

Under Alternative B (Realigned Alternative), VAFB will avoid negative impacts to two archaeological sites by using protection measures to install poles within NRHP-eligible site boundaries and by modifying the alignment of the new feeder lines. The EA stipulated protection measures and realignment should ensure NRHP-eligible sites would not be adversely affected under Alternative B (Realigned Alternative).

### **PREFERRED ALTERNATIVE**

Alternative B (Realigned Alternative) is the preferred alternative because it is the only alternative that fulfills the purpose and need for the Proposed Action while avoiding significant adverse impacts to sensitive archaeological sites.

### **FINDING OF NO SIGNIFICANT IMPACT**

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR Part 989, I conclude that Alternative B (Realigned Alternative) would not have a significant environmental impact, either by itself or cumulatively with other projects at VAFB. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

**FINDING OF NO SIGNIFICANT IMPACT**

**CONCURRENCE PAGE**

**In Conjunction with the Final Environmental Assessment for the Repairs and Replacement of Overhead Electrical Line, Feeders N1, N3, and N6 at Vandenberg Air Force Base, California**

  
\_\_\_\_\_  
RICHARD W. BOLTZ, Col. USAF  
Commander, 30th Space Wing

  
\_\_\_\_\_  
Date



# **Final Draft Environmental Assessment**

**for**

## **Repairs and Replacement of Overhead Electrical Line, Feeders N1, N3, and N6 Vandenberg Air Force Base, California**

Prepared for:

30th Civil Engineer Squadron, Asset Management Flight  
1028 Iceland Avenue  
Vandenberg Air Force Base, CA 93437

Prepared by:

Science Applications International Corporation  
5464 Carpinteria Ave, Suite K  
Carpinteria, CA 93013

22 August 2011



**This page intentionally left blank.**

## Executive Summary

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with repairing and replacing an aging overhead electrical line, Feeders N1, N3, and N6 on Vandenberg Air Force Base (AFB) in Santa Barbara County, California. The current proposal addresses Feeder Lines N1, N3, and N6 on south Vandenberg AFB. These feeder lines supply electrical power specifically to Vandenberg AFB space launch complexes (SLCs) and associated facilities. The lines cover a distance of 20 miles and are in need of multiple repairs and, in some cases, replacement of power poles and electrical equipment.

The National Environmental Policy Act (NEPA) of 1969, as amended, and Council on Environmental Quality (CEQ) regulations require lead agencies to evaluate the potential impacts of federal actions on the surrounding environment. The United States Air Force (Air Force or USAF) is the lead agency for NEPA compliance on the proposed action.

### Purpose and Need for the Proposed Action

The purpose of the proposed action is to repair and replace the overhead electrical line, Feeders N1, N3, and N6 needed to support Vandenberg AFB 30<sup>th</sup> Space Wing's (30 SW) space launch mission. The proposed action is needed because existing conditions do not provide a reliable power source required to support launch operations on south Vandenberg AFB. If these lines are not repaired and replaced, electrical supply to Vandenberg AFB's SLCs may fail. If such failure happens during mission-essential operations, e.g., space launch preparations and space launches, key national defense missions may be delayed or cancelled. This could negatively impact United States security and safety.

### Description of Alternative A (Proposed Action)

The proposed action includes demolition of existing electrical lines and construction of new overhead electrical lines and access roads over an approximately 14-month period. Approximately 94,900 linear feet (20 miles) of existing overhead electrical lines would be replaced with approximately 55,500 linear feet (11 miles) of new lines on the southwestern portion of south Vandenberg AFB. The project area encompasses approximately 1,020 acres. However, proposed activities would only occur within a 30-foot (wide) corridor approximately 150,000 feet (28.4 miles) in length, which would result in a maximum disturbance area of 104 acres. Because construction plans would be developed under a design-build contract, minor deviations from the current conceptual site plans may be required during the final design phase that would minimize the total area disturbed.

Generally, the new overhead electrical lines would be adjacent to existing roads to the extent feasible, and the new lines would deviate from the existing distribution system alignment along some of the route. Subsequent to installation of the new lines, the majority of the existing lines (i.e., wires, electrical equipment, and poles) would be removed. However, some powerlines may be "abandoned in place" or removed utilizing non-invasive removal options due to unstable topography conditions or to minimize environmental impacts (e.g., unnecessary vegetation removal and soil disturbance). In environmentally sensitive areas (e.g., beach layia habitat) poles would be removed in stages to reduce impacts to the maximum extent feasible. Potential non-invasive removal options include cutting poles into pieces and then manually transporting them to adjacent roads or removing poles by crane or helicopter; these options would be required on

approximately five percent (51 acres) of the total project area. In order to prevent electrical service interruptions on south Vandenberg AFB, the existing lines would remain operational until installation, testing, and initial operation of the new lines is completed. The new overhead electrical lines would be maintained by annual inspections.

### **Feeder Lines N1 and N3**

Existing Feeder Lines N1 and N3 extend south from Substation N on Coast Road to the Boathouse area on Coast Road. Approximately 75 percent of the existing electrical lines are adjacent to existing roads. The project area for the new Feeder Lines N1 and N3 is approximately 320 acres. Approximately 97 percent of the new overhead electrical lines would be installed within 30 feet of existing roads. Nine new poles on Feeder Line N3 located approximately 200 feet northwest of the Coast Road/Tow Route intersection would be located west of the existing electrical lines within the road berm to avoid sensitive archaeological resources.

### **Feeder Line N6**

Existing Feeder Line N6 extends northeast and east from Substation N on Coast Road to an area east of SLC-4 adjacent to Plato Road. Approximately 1.6 miles (51 acres) of the existing electrical line is adjacent to and within an environmentally sensitive area (i.e., beach layia habitat). The new Feeder Line N6 would encompass approximately 700 acres. Approximately 50 percent of the new electrical lines would be installed within 30 feet of existing roads. None of the new alignment would be installed within or adjacent to beach layia habitat.

### **Site Improvements**

Site development would require clearing and grading within the 104-acre maximum disturbance area. The proposed action would require rehabilitating and/or revegetating old access roads subsequent to

construction. New access roads would be constructed as necessary within the 104-acre maximum disturbance area. Staging areas would be provided onsite for equipment, supplies, and vehicle parking. Staging areas would be located within existing parking lots, roads, or within areas of invasive species (iceplant) pre-identified by Vandenberg AFB natural resources management personnel and outside of known cultural resources.

The proposed action would result in a negligible increase in operations/maintenance activities due to repairing and replacing the overhead electrical lines on south Vandenberg AFB. Accordingly, there would be no consequential change in the level of operations/maintenance activities associated with the proposed action.

### **Description of Alternative B (Realigned Alternative)**

This alternative is the same as Alternative A (proposed action) except that a portion of the new overhead electrical lines would be realigned to avoid sensitive archaeological resources. All ground-disturbing activities would be avoided in these environmentally sensitive areas.

### **No-Action Alternative**

Under the No-Action Alternative, the proposed action would not occur and mission operations on south Vandenberg AFB would continue to be subject to unexpected delays due to powerline failures. As discussed above, existing conditions do not provide a reliable power source required to support launch operations on south Vandenberg AFB.

The No-Action Alternative provides a measure of the baseline conditions against which the impacts of the proposed action can be compared. In this EA, the No-Action Alternative is represented by the baseline

conditions described in Chapter 3, Affected Environment.

## Preferred Alternative

Alternative B is the preferred alternative because it is the only alternative that fulfills the purpose and need for the proposed action while avoiding adverse impacts on sensitive archaeological resources.

## Alternatives Considered but Eliminated

As part of the Air Force's decision-making process, three alternatives were considered but not carried forward for detailed analysis as they were determined infeasible since they did not meet the purpose and need for the proposed action, as described below.

### Alternative Energy Sources

Utilization of alternative energy sources, including solar and wind energy, was considered as a potential alternative. Although solar and wind energy technologies are continually improving, these technologies would not produce adequate electricity to provide a reliable power source on south Vandenberg AFB. In addition to these technologies, onsite generators would be required at the SLCs. Time constraints associated with permitting requirements and lease agreements for onsite generators could result in mission delays due to powerline failures. Furthermore, new powerlines would be required to transfer electricity from the generators. Therefore, this alternative would not meet the purpose and need of the proposed action and was eliminated from further analysis.

### Direct Replacement

An alternative was considered that included replacing the existing electrical lines in the same location. However, this alternative would not provide a redundant power source (i.e., one line operable at all times) during construction, which would result in electrical

service interruptions on south Vandenberg AFB. Therefore, this alternative was eliminated from further analysis.

### Underground and In-Road Replacement

An alternative was considered that included construction of an underground electrical system and the subsequent removal of the existing overhead electrical lines. However, due to the substantial cost associated with underground utility replacement, it would be economically infeasible to construct this alternative. Therefore, this alternative was eliminated from further analysis.

## Resource Areas Evaluated

Resource areas analyzed in this EA include: air quality; biological resources; cultural resources; geology and earth resources; land use and coastal zone resources; noise; public health and safety; transportation; visual resources; and water resources.

## Summary of Environmental Impacts

The environmental consequences associated with implementation of the proposed action and alternatives are presented and compared in Table ES-1. For a detailed description and analysis, refer to Chapter 4, Environmental Consequences. As shown in Table ES-1, implementation of Alternative A (proposed action) would result in adverse impacts on sensitive archaeological resources. However, implementation of Alternative B and the No-Action Alternative would not result in adverse impacts to any resource area.

Table ES-1. Summary of Potential Environmental Consequences

<b>Resource</b>	<b>Alternative A (Proposed Action)</b>	<b>Alternative B (Realigned Alternative)</b>	<b>No-Action Alternative</b>
<b>Air Quality</b>	Proposed emissions associated with demolition and construction activities would not exceed the significance thresholds for criteria pollutants or greenhouse gases. Therefore, no adverse impacts on air quality would occur.	Under Alternative B, impacts on air quality would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts on air quality would occur.
<b>Biological Resources</b>	The proposed action would not result in direct impacts to riparian plant communities or habitats and no direct adverse impacts to common terrestrial wildlife. Implementation of the environmental protection measures for the proposed action and included in the Biological Opinion would ensure that impacts on special status species would be minimized.	Under Alternative B, impacts on biological resources would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur. As there would be no change in existing conditions, no impacts on biological resources would occur.
<b>Cultural Resources</b>	Implementation of environmental protection measures, including installation of temporary exclusionary fencing, prohibiting vehicular access within known cultural sites, and adherence to 36 Code of Federal Regulations (CFR) 800.13 and Vandenberg AFB Integrated Cultural Resources Management Plan procedures in the event previously undocumented cultural resources are discovered during construction activities, would minimize impacts on most cultural resource sites within the project area. However, proposed installation and/or removal of poles within two archaeological site boundaries would adversely affect these National Register of Historic Places (NRHP)-eligible sites.	Realigning the new feeder line routes to avoid two NRHP - eligible sites within the project area under this alternative would reduce impacts on cultural resources compared to Alternative A. Under Alternative B, Vandenberg AFB would adopt a strategy of avoidance at these two sites by imposing conditions upon the installation of poles within site boundaries and by modifying the alignment of the new feeder lines.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts on cultural resources would occur.
<b>Geology and Earth Resources</b>	With the use of Best Management Practices (BMPs) and implementation of an erosion control plan, adverse impacts to geology and earth resources would not occur.	Under Alternative B, impacts on geology and earth resources would be the same as those described for Alternative A.	For the No-Action Alternative the proposed action would not occur, and there would be no change in existing conditions. No impacts on geology and earth resources would occur.
<b>Land Use and Coastal Zone Resources</b>	The proposed action would be compatible with the existing facilities in the project area, and land use would be the same as existing uses onsite. Proposed activities would not have any direct or indirect effects on coastal uses and resources. Therefore, adverse impacts on land use and coastal zone resources would not occur.	Under Alternative B, impacts on land use and coastal zone resources would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur. As there would be no change in existing conditions, no impacts on land use and coastal zone resources would occur.
<b>Noise</b>	Implementation of the proposed action would temporarily increase noise in the project vicinity associated with demolition and construction activities. However, construction activities would not result in substantial increases in noise above existing conditions. Noise generated by annual maintenance activities would be consistent with the existing uses at the project site and would not substantially differ from the existing noise environment within the project vicinity. Therefore, adverse impacts on noise would not occur.	Under Alternative B, impacts on noise would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts on noise would occur.
<b>Public Health and Safety</b>	Proposed construction activities would require the use of hazardous materials; however, compliance with all applicable federal, state and local rules during proposed activities would minimize the potential for adverse effects. All applicable Occupational Safety and Health Act (OSHA) requirements and Air Force regulations would be specified in construction contractor contracts and implemented with standard BMPs associated with the proposed action. Therefore, adverse impacts on public health and safety would not occur.	Under Alternative B, impacts on public health and safety would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur. As there would be no change in existing conditions, no impacts on public health and safety would occur.



Table ES-1. Summary of Potential Environmental Consequences (continued)

<b>Resource</b>	<b>Alternative A (Proposed Action)</b>	<b>Alternative B (Realigned Alternative)</b>	<b>No-Action Alternative</b>
<b>Transportation</b>	Implementation of the proposed action would temporarily affect the local roadway network during project construction. However, since increases in traffic volumes would be temporary, no long-term impacts to the regional transportation network would occur. Proposed annual maintenance activities would not substantially increase overall traffic volumes or circulation patterns within the Base. Therefore, adverse impacts to transportation would not occur.	Under Alternative B, impacts on transportation would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur, and there would be no change to existing conditions. No impacts on transportation would occur.
<b>Visual Resources</b>	Implementation of the proposed action would not adversely affect views of the project site. In addition, proposed overhead electrical lines would be visually compatible with existing military activity in the project vicinity. Therefore, adverse impacts on visual resources would not occur.	Under Alternative B, impacts on visual resources would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur. As there would be no change in existing conditions, no impacts on visual resources would occur.
<b>Water Resources</b>	Proposed grading and construction activities would result in temporary soil disturbance, thus increasing the potential for short-term erosion within the immediate drainage area. In addition, the proposed action would potentially discharge construction- and operation-related waste materials that could affect the quality of surface water or shallow groundwater downstream from the project site. However, implementation of an erosion control plan, BMPs, and incorporation of drainage features into project design, would ensure the proposed action would not result in adverse impacts to water resources.	Under Alternative B, impacts on water resources would be the same as those described for Alternative A.	For the No-Action Alternative, the proposed action would not occur, and there would be no change in existing conditions. No impacts on water resources would occur.

**This page intentionally left blank.**

# Table of Contents

Executive Summary .....	ES-1
Acronyms and Abbreviations .....	vi
1 Purpose and Need for the Proposed Action .....	1-1
1.1 Purpose of the Proposed Action .....	1-1
1.2 Need for the Proposed Action.....	1-1
1.3 Project Location .....	1-2
1.4 Legal Requirements.....	1-2
1.5 Interagency Coordination and Consultation.....	1-4
1.6 Objectives of the Environmental Assessment.....	1-4
2 Proposed Action and Alternatives.....	2-1
2.1 Selection Criteria for Alternatives.....	2-1
2.2 Alternative A: Proposed Action .....	2-1
2.3 Alternative B: Realigned Alternative .....	2-5
2.4 Alternative C: No-Action Alternative.....	2-6
2.5 Environmental Protection Measures .....	2-6
2.6 Other Alternatives Considered.....	2-9
2.7 Preferred Alternative .....	2-10
3 Affected Environment .....	3-1
3.1 Air Quality .....	3-1
3.1.1 Regional Setting .....	3-1
3.1.2 Greenhouse Gas Emissions.....	3-3
3.1.3 Applicable Regulations and Standards.....	3-4
3.2 Biological Resources .....	3-5
3.2.1 Methodology .....	3-6
3.2.2 Vegetation Types.....	3-6
3.2.3 Wildlife Species .....	3-7
3.2.4 Special Status Species.....	3-7
3.2.5 Waters of the U.S. and Wetlands .....	3-11
3.3 Cultural Resources .....	3-11
3.3.1 Area of Potential Effects .....	3-11
3.3.2 Cultural Setting .....	3-11
3.3.3 Cultural Resources within the Project Area .....	3-12
3.4 Geology and Earth Resources.....	3-13
3.4.1 Soils.....	3-13
3.4.2 Faulting and Seismicity.....	3-16
3.4.3 Geologic Hazards .....	3-16
3.5 Land Use and Coastal Zone Resources .....	3-16
3.6 Noise.....	3-17
3.6.1 Noise Characteristics.....	3-17
3.6.2 Sound Level and Frequency.....	3-17
3.6.3 Noise Descriptors .....	3-18
3.6.4 Human Response to Noise.....	3-18
3.6.5 Existing Noise Sources.....	3-18
3.7 Public Health and Safety .....	3-19
3.7.1 Hazardous Materials Management.....	3-19
3.7.2 Hazardous Waste Management .....	3-20
3.7.3 Installation Restoration Program .....	3-20
3.7.4 Unexploded Ordnance.....	3-21

3.8	Transportation.....	3-21
3.8.1	Roadway Operations .....	3-22
3.9	Visual Resources .....	3-22
3.9.1	Visual Quality .....	3-24
3.9.2	Glare .....	3-24
3.10	Water Resources .....	3-24
3.10.1	Surface Water .....	3-25
3.10.2	Groundwater .....	3-25
4	Environmental Consequences .....	4-1
4.1	Air Quality .....	4-1
4.1.1	Alternative A: Proposed Action .....	4-1
4.1.2	Alternative B: Realigned Alternative .....	4-2
4.1.3	Alternative C: No-Action Alternative .....	4-3
4.2	Biological Resources .....	4-3
4.2.1	Alternative A: Proposed Action .....	4-3
4.2.2	Alternative B: Realigned Alternative .....	4-5
4.2.3	Alternative C: No-Action Alternative .....	4-6
4.3	Cultural Resources .....	4-6
4.3.1	Alternative A: Proposed Action .....	4-6
4.3.2	Alternative B: Realigned Alternative .....	4-6
4.3.3	Alternative C: No-Action Alternative .....	4-9
4.4	Geology and Earth Resources.....	4-9
4.4.1	Alternative A: Proposed Action .....	4-9
4.4.2	Alternative B: Realigned Alternative .....	4-10
4.4.3	Alternative C: No-Action Alternative .....	4-10
4.5	Land Use and Coastal Zone Resources .....	4-10
4.5.1	Alternative A: Proposed Action .....	4-10
4.5.2	Alternative B: Realigned Alternative .....	4-10
4.5.3	Alternative C: No-Action Alternative .....	4-11
4.6	Noise.....	4-11
4.6.1	Alternative A: Proposed Action .....	4-11
4.6.2	Alternative B: Realigned Alternative .....	4-12
4.6.3	Alternative C: No-Action Alternative .....	4-12
4.7	Public Health and Safety .....	4-12
4.7.1	Alternative A: Proposed Action .....	4-12
4.7.2	Alternative B: Realigned Alternative .....	4-13
4.7.3	Alternative C: No-Action Alternative .....	4-14
4.8	Transportation.....	4-14
4.8.1	Alternative A: Proposed Action .....	4-14
4.8.2	Alternative B: Realigned Alternative .....	4-14
4.8.3	Alternative C: No-Action Alternative .....	4-14
4.9	Visual Resources .....	4-14
4.9.1	Alternative A: Proposed Action .....	4-15
4.9.2	Alternative B: Realigned Alternative .....	4-15
4.9.3	Alternative C: No-Action Alternative .....	4-15
4.10	Water Resources .....	4-15
4.10.1	Alternative A: Proposed Action .....	4-15
4.10.2	Alternative B: Realigned Alternative .....	4-17
4.10.3	Alternative C: No-Action Alternative .....	4-17
4.11	Cumulative Impacts .....	4-17
4.11.1	Projects Considered in the Cumulative Analysis .....	4-18

	4.11.2 Cumulative Impact Analysis .....	4-18
5	List of Preparers .....	5-1
6	List of Agencies, Organizations, and Persons Contacted .....	6-1
7	References .....	7-1

## Appendices

A	Air Quality Emissions Calculations
---	------------------------------------

## List of Figures

1-1	Regional Map .....	1-3
2-1	Feeder Lines N1, N3: Existing and Proposed Overhead Electrical Lines .....	2-2
2-2	Feeder Line N6: Existing and Proposed Overhead Electrical Lines.....	2-4
3.2-1	Potential Beach Layia Habitat in the Project Vicinity.....	3-8
3.8-1	Existing Roadways in the Project Vicinity.....	3-23

## List of Tables

ES-1	Summary of Potential Environmental Consequences .....	ES-4
3.1-1	National and California Ambient Air Quality Standards.....	3-2
3.1-2	Santa Barbara County Air Quality Attainment Status.....	3-3
3.1-3	Ambient Air Quality at Vandenberg AFB.....	3-3
3.2-1	Special Status Plant and Wildlife Species within the Project Area.....	3-7
3.3-1	Archaeological Sites within the Study Area.....	3-14
3.6-1	Definitions of Acoustical Terms .....	3-17
3.6-2	Typical Noise Levels in the Environment .....	3-18
4.1-1	Proposed Emissions under Alternative A (Proposed Action) (Tons/Year) .....	4-2
4.3-1	Environmental Consequences to Cultural Resources from the Proposed Action .....	4-7
4.6-1	Estimated Construction/Demolition Equipment Noise Levels .....	4-11
4.11-1	Related and Cumulative Projects .....	4-18



**This page intentionally left blank.**

## Acronyms and Abbreviations

30 CES	30 <sup>th</sup> Civil Engineer Squadron
30 CES/CEA	30 <sup>th</sup> Civil Engineer Squadron, Asset Management Flight
30 CES/CEAN	30 <sup>th</sup> Civil Engineer Squadron, Asset Management Flight, Natural Resources Management
30 CES/CEV	30 <sup>th</sup> Civil Engineer Squadron, Environmental Flight
30 SW	30 <sup>th</sup> Space Wing
30 SW/SE	30 <sup>th</sup> Space Wing Safety Office
30 SW/SEW	30 <sup>th</sup> Space Wing Safety-Weapon Safety
AB	Assembly Bill
AFB	Air Force Base
Air Force	United States Air Force
AOC	Area of Concern
AOI	Area of Interest
APE	Area of Potential Effects
BMPs	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CAP	Collection Accumulation Point
CARB	California Air Resource Board
CCA	California Coastal Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CDMG	California Division of Mines and Geology
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH <sub>4</sub>	methane
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2e</sub>	CO <sub>2</sub> equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-Weighted Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EESOH-MIS	Enterprise Environmental, Safety, and Occupational Health Information Management System
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ESA	Endangered Species Act
FR	Federal Register
GHGs	greenhouse gases

GIS	Geographic Information System
GWP	global warming potential
HazMart	Hazardous Materials Pharmacy
Hz	Hertz
IRP	Installation Restoration Program
kV	kilovolt
L <sub>eq</sub>	Equivalent Noise Level
LOS	Level of Service
µg/m <sup>3</sup>	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
N <sub>2</sub> O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO <sub>x</sub>	nitrogen oxides
NOAA Fisheries Service	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O <sub>3</sub>	ozone
OSHA	Occupational Safety and Health Act
PCBs	Polychlorinated biphenyls
PG&E	Pacific Gas & Electric
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter
PM <sub>10</sub>	particulate matter less than 10 microns in diameter
POLs	petroleum, oil, and lubricants
ppm	parts per million
RWQCB	Regional Water Quality Control Board
SAP	satellite accumulation point
SBCAPCD	Santa Barbara County Air Pollution Control District
SCCAB	South Central Coast Air Basin
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLC	Space Launch Complex
SR	State Route
SWP	Space Wing Plan
SWRCB	State Water Resources Control Board
TPH	total petroleum hydrocarbons
TPH-d	total petroleum hydrocarbons-diesel
TPH-d/mo	total petroleum hydrocarbons-diesel/motor oil
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
UXO	unexploded ordnance
VOCs	volatile organic compounds

# Chapter 1. Purpose and Need for the Proposed Action

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with repairing and replacing an aging overhead electrical line, Feeders N1, N3, and N6 on Vandenberg Air Force Base (AFB) in Santa Barbara County, California. There are numerous overhead electrical lines on Vandenberg AFB, spanning many miles of terrain. The current proposal addresses Feeder Lines N1, N3, and N6 on south Vandenberg AFB. These feeder lines supply electrical power specifically to Vandenberg AFB space launch complexes (SLCs) and associated facilities. The lines cover a distance of 20 miles and are in need of multiple repairs and, in some cases, replacement of power poles and electrical equipment.

The Vandenberg AFB power distribution system receives power from Pacific Gas & Electric (PG&E) via two 69 kilovolt (kV) overhead powerlines from PG&E's Divide Substation that terminate at the Vandenberg AFB Switching Station. From the Switching Station, North Loop and South Loop overhead lines are routed to substations on north and south Vandenberg AFB. Substation N is located on south Vandenberg AFB along Coast Road approximately 0.5 miles from Point Pedernales. Six separate 12 kV electrical feeder lines originate from Substation N, including Feeder Lines N1, N3, and N6.

Feeder Lines N1, N3, and N6 are hung on wooden cross bars mounted on wooden poles. Most, if not all, of the original access roads established to construct these feeder lines have been overgrown with vegetation. Therefore, vehicular access to these feeder lines is non-existent, which results in emergency repairs forced by power failures. Recently, unreliable power supply to SLC-6 resulted in a postponed launch of a Delta IV Heavy vehicle carrying a National Reconnaissance Organization satellite.

The proposed action would construct all new feeder lines along existing roads to the extent feasible, thus providing easy access and

## Purpose

Repair and replace aging electrical line to support mission operations on south Vandenberg AFB.

## Need

South Vandenberg AFB missions are subject to delays due to power failures.

facilitating regular maintenance. In areas where new feeder alignments cannot be located near existing roads, access roads would be established. In a few areas, the existing feeder line runs underground through conduit. Replacement of the underground feeder lines would include pulling new conductor lines through the existing conduit or, in two locations near SLC-6, excavation of new trenches if the old conduit is unusable. Subsequent to construction of the new feeder lines, the existing feeder lines would be dismantled.

The National Environmental Policy Act (NEPA) of 1969, as amended, and Council on Environmental Quality (CEQ) regulations require lead agencies to evaluate the potential impacts of federal actions on the surrounding environment. The United States Air Force (Air Force of USAF) is the lead agency for NEPA compliance on the proposed action.

## 1.1 Purpose of the Proposed Action

The purpose of the proposed action is to repair and replace the 12.47 kV overhead electrical line, Feeders N1, N3, and N6 needed to support Vandenberg AFB 30<sup>th</sup> Space Wing's (30 SW) space launch mission.

## 1.2 Need for the Proposed Action

The proposed action is needed because existing conditions do not provide a reliable power source required to support launch operations on south Vandenberg AFB. Feeder Line N is a primary power source to SLC-6 and SLC-4. Under present conditions, existing and future launch operations and range missions at several locations throughout south

Vandenberg AFB would continue to be subject to unexpected mission delays due to powerline failures. If these lines are not repaired and replaced, electrical supply to Vandenberg AFB's SLCs may fail. If such failure happens during mission-essential operations, e.g., space launch preparations and space launches, key national defense missions may be delayed or cancelled. This could negatively impact United States (U.S.) security and safety. Additionally, the deteriorated powerlines are unsafe and substantially increase the risks for wildfires.

### 1.3 Project Location

Vandenberg AFB is headquarters for 30 SW, the Air Force's Space Command unit that operates Vandenberg AFB and the Western Test Range/Pacific Missile Range (Western Range). Vandenberg AFB operates as an aerospace center that supports west coast launch activities for the Air Force, Department of Defense (DoD), National Aeronautics and Space Administration, and commercial contractors. The Air Force's primary missions at Vandenberg AFB are to launch and track satellites in space, test and evaluate intercontinental ballistic missile systems, and support aircraft operations in the Western Range.

Vandenberg AFB is located on the south-central coast of California, approximately 55 miles northwest of Santa Barbara (Figure 1-1). The Base covers approximately 99,000 acres in western Santa Barbara County. The Santa Ynez River and State Route (SR) 246 divide Vandenberg AFB into two distinct areas: north Vandenberg AFB and south Vandenberg AFB. The proposed action is located on south Vandenberg AFB parallel to and approximately 0.25 miles inland from the Pacific Ocean, between SLC-4 and SLC-6 and the Vandenberg Harbor and Boathouse south of SLC-6.

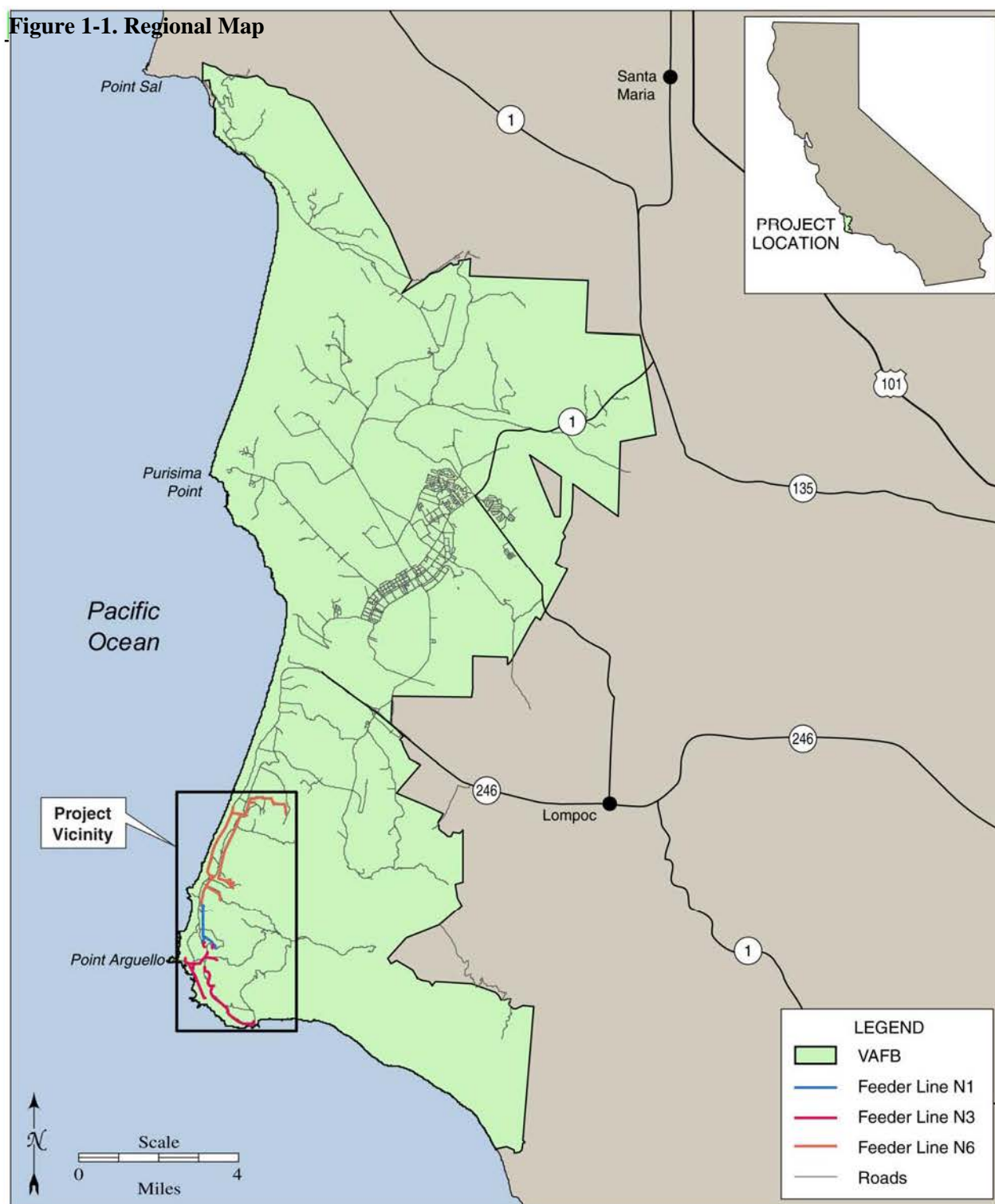
### 1.4 Legal Requirements

A critical component of preparing this EA is a thorough identification of all environmental laws, regulations, and directives that would

apply to the proposed action and alternatives. The Air Force determined that the following laws and regulations must be reviewed for their relevance to the proposed action:

Federal Laws & Regulations	
➤	American Indian Religious Freedom Act of 1978 (42 United States Code [U.S.C.] 1996)
➤	Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469a <i>et seq.</i> )
➤	Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm), Supplemental Regulations of 1984
➤	Clean Air Act (CAA) of 1970 (42 U.S.C. 7401 <i>et seq.</i> )
➤	Clean Water Act (CWA) of 1977 as amended (33 U.S.C. 1251 <i>et seq.</i> )
➤	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601-9675),
➤	Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451-1464)
➤	Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 <i>et seq.</i> )
➤	Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 U.S.C. 703-712)
➤	NEPA of 1969 as amended (42 U.S.C. 4321-4347)
➤	National Historic Preservation Act (NHPA) of 1966 as amended (16 U.S.C. 470 <i>et seq.</i> )
➤	Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013)
➤	Noise Control Act (NCA) of 1972 (42 U.S.C. 4901 <i>et seq.</i> )
➤	Occupational Safety and Health Act (OSHA) of 1970 (29 U.S.C. 659-678)
➤	Pollution Prevention Act of 1990 (42 U.S.C. 13101-13109)
➤	Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 <i>et seq.</i> )
➤	Superfund Amendments and Reauthorization Act (42 U.S.C. 9601-9675)
➤	Title II of the Toxic Substances Control Act of 1976 (15 U.S.C. 2601 <i>et seq.</i> )
State Laws & Regulations	
➤	California Coastal Act of 1976
➤	California Clean Air Act of 1988
➤	Porter-Cologne Water Quality Control Act
➤	California Integrated Waste Management Act of 1989, California Assembly Bill (AB) 939





**Figure 1-1. Regional Map**

## 1.5 Interagency Coordination and Consultation

Due to the known or potential occurrence of beach layia, California red-legged frog, El Segundo blue butterfly, and Gaviota tarplant within the project area, formal consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the ESA was completed on 4 May 2011. USFWS issued a Biological Opinion stating that the proposed activities would not jeopardize the continued existence of any federally listed species. Vandenberg AFB will comply with all terms and conditions stipulated in the Biological Opinion.

The proposed action is a federal undertaking subject to compliance with Section 106 of the NHPA. As the proposed action has the potential to cause effects on historic properties, Vandenberg AFB initiated consultation with the State Historic Preservation Officer (SHPO) under 36 Code of Federal Regulations (CFR) Part 800. Vandenberg AFB determined that implementation of environmental protection measures and modifying the project design as proposed under Alternative B would ensure the proposed action would have no adverse effect to any of the historic properties within the project area. SHPO concurred with Vandenberg AFB's determination in a letter dated 20 June 2011.

Where federal projects occur within the coastal zone (i.e., coastal waters, to include lands lying in coastal waters and submerged there under and adjacent shore lands) as defined in Section 304(1) of the CZMA and as described in a state's federally approved Coastal Management Program, or where such projects may affect coastal uses or resources, they are subject to federal consistency review. The Air Force submitted a Negative Determination letter to the CCC on 9 May 2011 indicating that repairing and replacing electrical line Feeders N1, N3, and N6, would not affect the coastal zone. The Air Force concluded the proposed action does not require a consistency determination.

## 1.6 Objectives of the Environmental Assessment

Consistent with 32 CFR Part 989 and CEQ regulations (40 CFR 1500-1508), the scope of analysis presented in this EA is defined by the potential range of environmental impacts resulting from implementing the proposed action and alternatives, including the Realigned Alternative and No-Action Alternative. Resources potentially impacted are considered in more detail to determine whether additional analysis is required pursuant to 40 CFR Part 1501.4(c).

This EA identifies, describes, and evaluates the potential environmental impacts that could result from the proposed action. As appropriate, the EA describes the affected environment and environmental consequences of the proposed action and identifies measures to prevent or minimize environmental impacts.

The resources analyzed in this EA include: air quality; biological resources; cultural resources; geology and earth resources; land use and coastal zone resources; noise; public health and safety; transportation; visual resources; and water resources.

The following resources were considered but eliminated from detailed analysis in this EA since potential impacts would be non-existent or considered negligible.

- *Environmental Justice.* Pursuant to Executive Order (EO) 12898, Environmental Justice, the potential effects of the proposed action on minority and low-income communities were considered. Because the proposed action would occur within Vandenberg AFB boundaries, minority and/or low-income populations within the region of influence (Lompoc and Santa Maria Valleys) would not be affected.
- *Socioeconomics.* Construction and operation of the proposed action would not affect the socioeconomic

conditions of the region (Lompoc and Santa Maria Valleys).

- *Public Services and Utilities.* There would be no additional military, government/civilian, and contractor support personnel stationed at Vandenberg AFB as a result of the proposed action. Consequently, the

proposed action would not result in a need for substantial increases in public services or utilities.

- *Recreation.* Access to Vandenberg AFB is controlled by the Air Force and public access to the project area is not allowed for general outdoor recreation.

**This page intentionally left blank.**

## Chapter 2. Proposed Action and Alternatives

This chapter includes the selection criteria for alternatives, and describes Alternative A (proposed action), Alternative B (Realigned Alternative), and No-Action Alternative.

### 2.1 Selection Criteria for Alternatives

*CEQ Regulations for Implementing the Procedural Provisions of NEPA* establish a number of policies for federal agencies, including “using the NEPA process to identify and assess the reasonable alternatives to the proposed action that will avoid or minimize adverse effects of these actions on the quality of the human environment” (40 CFR 1500.2 [e]). The range of reasonable alternatives in this EA was identified by evaluating their ability to meet the purpose and need of the proposed action and their ability to meet the following screening criteria. To be considered reasonable an alternative must:

- Criterion 1: Be located on south Vandenberg AFB;
- Criterion 2: Provide a reliable power source required to support launch operations on south Vandenberg AFB;
- Criterion 3: Be located within areas where reasonable access is available to the new poles and powerlines for annual maintenance; and
- Criterion 4: Provide a redundant power source (i.e., one line operable at all times) during construction.

### 2.2 Alternative A: Proposed Action

The proposed action includes demolition of existing electrical lines and construction of new overhead electrical lines and access roads over an approximately 14-month period. Approximately 94,900 linear feet (20 miles) of existing overhead electrical lines would be replaced with approximately 55,500

linear feet (11 miles) of new lines on the southwestern portion of south Vandenberg AFB (Figure 2-1). Generally, the new overhead electrical lines would be adjacent to existing roads to the extent feasible, and the new lines would deviate from the existing distribution system alignment along some of the route. Subsequent to installation of the new lines, the majority of the existing lines (i.e., wires, electrical equipment, and poles) would be removed. However, some powerlines may be “abandoned in place” or removed utilizing non-invasive removal options due to unstable topography conditions or to minimize environmental impacts (e.g., unnecessary vegetation removal and soil disturbance). In environmentally sensitive areas (e.g., beach layia habitat) poles would be removed in stages to reduce impacts to the maximum extent feasible. Potential non-invasive removal options include cutting poles into pieces and then manually transporting them to adjacent roads or removing poles by crane or helicopter; these options would be required on approximately five percent (51 acres) of the total project area. In order to prevent electrical service interruptions on south Vandenberg AFB, the existing lines would remain operational until installation, testing, and initial operation of the new lines is completed. The new overhead electrical lines would be inspected annually to determine the need for maintenance. The USAF will maintain the electrical lines to ensure mission success capability.

The project area encompasses approximately 1,020 acres. However, proposed activities would only occur within a 30-foot (wide) corridor approximately 150,000 feet (28.4 miles) in length, which would result in a maximum disturbance area of 104 acres. Because construction plans would be developed under a design-build contract, minor deviations from the current conceptual site plans may be required during the final design phase that would minimize the total area disturbed.





**Figure 2-1. Feeder Lines N1, N3: Existing and Proposed Overhead Electrical Lines**

### Feeder Lines N1 and N3

Existing Feeder Lines N1 and N3 extend south from Substation N on Coast Road to the Boathouse area on Coast Road (Figure 2-1). Approximately 75 percent of the existing electrical lines are adjacent to existing roads. Due to unstable topography and limited vehicular access, a portion of Feeder Line N3 adjacent to an ocean inlet south of Point Arguello would not be replaced. This segment would be abandoned in place. The existing wires and electrical equipment would be removed, as feasible. All electrical equipment would be properly disposed of in compliance with the Vandenberg AFB Qualified Recycling Program, ensuring that eligible items (e.g., copper wire, scrap metal, and other recoverable materials) are recycled.

The project area for the new Feeder Lines N1 and N3 is approximately 320 acres. Approximately 97 percent of the new overhead electrical lines would be installed within 30 feet of existing roads (Figure 2-1). Nine new poles on Feeder Line N3, located approximately 200 feet northwest of the Coast Road/Tow Route intersection, would be located west of the existing electrical lines within the road berm to avoid sensitive archaeological resources.

### Feeder Line N6

Existing Feeder Line N6 extends northeast and east from Substation N on Coast Road to an area east of SLC-4 adjacent to Plato Road (Figure 2-2). Approximately 1.6 miles (51 acres) of the existing electrical line is adjacent to and within an environmentally sensitive area (i.e., beach layia habitat). Fifteen poles along the existing Feeder Line N6 route located within beach layia habitat west of Coast Road, south of Bear Creek Road, and north of Honda Creek would be removed by crane to avoid impacts on this federally and state listed endangered species. Approximately nine percent of the existing electrical line is adjacent to existing roads.

The new Feeder Line N6 would encompass approximately 700 acres. Approximately 50

percent of the new electrical lines would be installed within 30 feet of existing roads (Figure 2-2).

### Modifications to Feeder Lines N1, N3, and N6

The following modifications would occur to Feeder Lines N1, N3, and N6:

- Install new wood poles, hardware such as insulators and guys (i.e., a cable designed to add stability to the poles), and string new aerial conductors (i.e., wires that carry an electrical current) on the overhead electrical line. All new power poles would be designed as “raptor safe”;
- Install new pole hardware on 10 poles (existing poles remain), including crossarms, fused cutouts (i.e., device that protects transformers from surges and overloads), lightning arresters (i.e., device that protects electrical equipment from lightning), and potheads (i.e., device used to transition an overhead conductor to underground);
- Install new pole-top transformers (i.e., device used to transfer electricity from one circuit to another) where necessary;
- Install new underground shielded cable in concrete-encased duct in various locations;
- Remove and dispose of all existing aerial conductors and hardware, such as insulators (i.e., material that holds conductors in place and blocks the flow of electrical currents) and crossarms (i.e., pole-top mounted structure that supports electrical transmission lines). All materials would be disposed of in compliance with the Vandenberg AFB Qualified Recycling Program, ensuring that eligible items are recycled. Non-recyclable ceramic insulators would be transported to the Vandenberg AFB Landfill, crushed and mixed with





**Figure 2-2. Feeder Line N6: Existing and Proposed Overhead Electrical Lines**



crushed concrete, and re-used as aggregate. Any transformers containing Polychlorinated biphenyls (PCBs) would be disposed of in accordance with federal and state Environmental Protection Agency (EPA) and OSHA regulations and the Vandenberg AFB Hazardous Material Management Plan (30 SWP 32-7086); and

- Remove and dispose of all existing creosote-treated wood poles. Poles that are in good/fair condition would be reused by the Air Force. These poles would be stored at Vandenberg AFB's Materials Diversion Center until they are reused for various projects on Base. Poles that are in poor condition and not suitable for reuse would be disposed of at an appropriate hazardous waste facility in compliance with applicable hazardous waste regulations.

## Site Improvements

### Access Roads

Demolition and removal of the existing overhead electrical lines would require re-establishing old access roads. The majority of old access roads would be rehabilitated and/or revegetated subsequent to construction. New access roads would be constructed as necessary within the 104-acre maximum disturbance area.

### Grading

Site development would require clearing and grading within the 104-acre maximum disturbance area. Grading would be designed to avoid high cut and fill slopes. Slopes would be contoured to the extent possible to provide smooth transitions between the proposed grading and adjacent landforms. Excavated soil would be balanced onsite to the extent feasible. Vegetation removal would be minimized to the extent feasible and avoided in surface water drainages. Heavy equipment would be prohibited in surface water drainages.

### Staging Areas

Staging areas would be provided onsite for equipment (e.g., tractors, backhoes, and rubber-wheeled trucks), supplies, and vehicle parking. Staging areas would be located within existing parking lots, roads, or within areas of invasive species (iceplant) pre-identified by Vandenberg AFB natural resources management personnel and outside of known cultural resources. Staging areas would be used for the temporary storage of excavated soils until the materials would be re-used and/or transported to a designated soil storage area on Vandenberg AFB or an appropriate offsite disposal facility. Cleared vegetation would be transported to the Vandenberg AFB Landfill.

### Disposal of Construction Debris

Demolition of the existing electrical lines and poles would generate construction debris. Hazardous waste could be encountered during demolition activities (e.g., creosote treated poles). All hazardous waste would be stored, transported, and disposed of in accordance with federal, state, and local regulations. Hazardous waste would be transported to the Consolidated Collection Accumulation Point (CAP) at Building 3300. All hazardous waste would be transported to the CAP and manifests would be signed by designated Vandenberg AFB staff prior to transport to a permitted offsite disposal facility.

### Operations/Maintenance

The proposed action would result in a negligible increase in operations/maintenance activities due to repairing and replacing the overhead electrical lines on south Vandenberg AFB. Accordingly, there would be no consequential change in the level of operations/maintenance activities associated with the proposed action.

## 2.3 Alternative B: Realigned Alternative

This alternative is the same as Alternative A (proposed action) except that a portion of the new overhead electrical lines would be

realigned to avoid sensitive archaeological resources.

The following portions of Feeder Lines N1 and N3 proposed under Alternative A would be realigned to avoid sensitive archaeological resources.

- Two new poles located on the southeast corner of the Tow Route west of Sudden Road would be relocated within the Tow Route road berm 120 feet south of the existing power poles.
- Two poles located east of Coast Road would be relocated east of the existing paved access road.

## 2.4 Alternative C: No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and mission operations on south Vandenberg AFB would continue to be subject to unexpected delays due to powerline failures. As discussed in Chapter 1, existing conditions do not provide a reliable power source required to support launch operations on south Vandenberg AFB.

The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose and need of the proposed action; however, it provides a measure of the baseline conditions against which the impacts of the proposed action can be compared. In this EA, the No-Action Alternative is represented by the baseline conditions described in Chapter 3, Affected Environment.

## 2.5 Environmental Protection Measures

The following environmental protection measures would be included in all the action alternatives (i.e., Alternative A and Alternative B).

### Air Quality

- Prior to proposed construction, portable equipment meeting the criteria defined in the *Final Regulation Order*, effective 12 September 2007 for the California Portable Equipment Registration Program would be registered in the program or would have a valid Santa Barbara County Air Pollution Control District (SBCAPCD) Permit to Operate.
- Equipment usage and fuel consumption would be documented and reported to 30<sup>th</sup> Civil Engineer Squadron, Asset Management Flight (30 CES/CEA) to facilitate tracking construction emissions for inclusion in the Vandenberg AFB Air Emissions Inventory.
- Idling of heavy-duty diesel trucks during loading and unloading activities would be limited to five minutes, with auxiliary power units used whenever possible.

The following control measures would be implemented to decrease diesel emissions. Diesel engines operated in California are required to meet California Air Resources Board (CARB) established standards, which may be more stringent than federal mandates.

- Engine size in equipment used for the project would be minimized.
- The use of equipment would be managed to minimize the number of pieces of equipment operating simultaneously and total operation time for the project.
- Engines would be maintained in tune per manufacturer or operator specification.
- If applicable, United States Environmental Protection Agency (USEPA) or CARB-certified diesel catalytic converters, diesel oxidation

catalysts, and diesel particulate filters would be installed.

- When applicable, equipment powered by diesel engines would be retrofitted to meet the Air Toxics Control Measures for Off-Road Vehicles.

Although significant emissions would not occur from the proposed action, the following SBCAPCD dust control measures would be implemented to further decrease fugitive dust emissions from ground disturbing activities.

- Water would be applied at least twice daily to dirt roads, graded areas, and dirt stockpiles to prevent excessive dust at the staging areas. Watering frequency would be increased whenever the wind speed exceeds 15 miles per hour. Chlorinated water would not be allowed to run into any waterway.
- Vehicle speeds would be minimized on exposed earth.
- Ground disturbance would be limited to the smallest, practical area and to the least amount of time.
- Best Management Practices (BMPs) to reduce dust emissions and the Environmental Protection Plan (EPP), which includes dust control compliance measures, would be implemented.
- Soil stockpiled for more than two days would be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site would be tarped from the point of origin.

Given the requirements of EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and the increasing concerns that greenhouse gases (GHGs) contribute to global climate change, the 30 CES/CEA would take into consideration and encourage measures that promote efficiency and conservation through

education, programs, and incentives to increase efficiency and conserve energy in projects on Vandenberg AFB.

### Biological Resources

- A USFWS-qualified biologist familiar with beach layia and seacliff buckwheat, the host plant of El Segundo blue butterfly, would survey the project footprint and place flags where avoidance of individual plants is feasible.
- Where avoidance is not feasible, suitable habitat for El Segundo blue butterfly would be enhanced at a 2:1 ratio in a nearby area that is not likely to be designated for future development; enhancement includes removal of invasive iceplant.
- A USFWS-qualified biologist familiar with California red-legged frog would monitor activities within areas determined sensitive for this species.
- Silt fencing, or other similar material, would be installed in areas determined appropriate by 30<sup>th</sup> Civil Engineer Squadron, Asset Management Flight, Natural Resources Management (30 CES/CEAN) biologists.
- All construction personnel would be required to attend a mandatory educational program about all listed species in the project area and their habitats.
- To salvage beach layia seed bank during Feeder Line N6 pole removal, the topsoil with seed bank would be removed and placed on a tarp. A nearby area twice the size of the area disturbed by the pole removal would be cleared of iceplant and the topsoil potentially containing beach layia seeds would be spread in the nearby cleared area and around the disturbed power pole area.
- In areas where beach layia is impacted, iceplant from an adjacent or

nearby area would be removed at a 2:1 ratio.

- A USFWS- qualified biological monitor would be present to brief the electrical crew prior to pole installation in the area with beach layia and would monitor pole installation to oversee seed bank removal and replacement.
- Prior to commencing the proposed action, the Air Force would survey the project area for areas that may fall within the definition of “waters of the U.S.” under Section 404 of the Federal Water Pollution Control Act (Clean Water Act [CWA]), including wetlands.
- Construction of the proposed action would avoid waters of the U.S., including wetland areas. Potential avoidance methods include installing poles and constructing access roads outside jurisdictional areas with the assistance of a qualified biological monitor. Activities within these areas would not occur within the wet season (i.e., when soils are wet or there is standing water).
- Because final construction plans would be developed under a design-build contract, minor deviations from the current conceptual site plan may be required during the final design phase. During this process, the design contractor would consult with Vandenberg AFB staff to plan construction that would avoid damage to jurisdictional areas. This avoidance approach would ensure construction of the proposed action would not place dredge or fill material in waters of the U.S.

### **Cultural Resources**

- Temporary exclusionary fencing would be installed between National Register of Historic Place (NRHP)-eligible sites and work areas to prohibit vehicular access.

- Vehicular access would be prohibited within NRHP-eligible sites. In these areas poles would be installed by a truck parked on existing roads. Potential pole removal options would include the following: (1) abandoning the poles in place, (2) cutting the poles off at the base and leaving them on the ground, or (3) cutting the poles off at the base and removing the poles from within site boundaries using other methods that do not require vehicular travel across the ground surface.
- In the event that previously undocumented cultural resources are discovered during construction activities, procedures established in 36 CFR 800.13 and the Vandenberg AFB Integrated Cultural Resources Management Plan would be followed.

### **Geology and Earth Resources**

- Prior to construction, the construction contractor would prepare an erosion control plan, which addresses the type, placement, and maintenance of erosion control features to be used during and following construction.

### **Public Health and Safety**

- Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling, and analysis of wastes generated.
- All hazardous materials would be properly identified and used in accordance with manufacturer’s specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment.
- All equipment would be properly maintained and free of leaks during construction and maintenance activities. All necessary equipment maintenance and repairs would be performed in pre-designated

controlled, paved areas to minimize risks from accidental spillage or release. Prior to construction, a Spill Prevention Plan would be submitted to 30<sup>th</sup> Civil Engineer Squadron, Environmental Flight (30 CES/CEV) for approval.

- Hazardous materials would be procured through or approved by the Vandenberg Hazardous Materials Pharmacy (HazMart). Monthly usage of hazardous materials would be reported to the HazMart to meet legal reporting requirements.
- The Air Force would comply with federal OSHA requirements during construction and annual maintenance activities.
- A Health and Safety Plan would be developed and implemented. In addition, the Air Force would coordinate with the 30<sup>th</sup> Space Wing Safety-Weapon Safety (30 SW/SEW) prior to implementing the proposed action to ensure no adverse effects would occur from unexploded ordnance (UXO) issues.
- Awareness training would be incorporated into the worker health and safety protocol to minimize potential adverse impacts from biological hazards (e.g., snakes and poison oak) and physical hazards (e.g., rocky and unstable terrain).

## Water Resources

- The construction contractor would implement BMPs to prevent inadvertent runoff of contaminants, such as construction debris, petroleum products, and hazardous materials.
- A drainage system would be constructed along rehabilitated old access roads and new roads to minimize impacts to water resources via soil erosion. The drainage system design would be finalized before

construction and would be reviewed by the 30<sup>th</sup> Civil Engineer Squadron (30 CES) Construction Stormwater Manager.

- 30 CES Operations and Maintenance personnel and construction contractors would obtain stormwater pollution prevention training.
- The construction contractor would adhere to accepted California BMP Manuals such as the California Stormwater Quality Association Manual.

## 2.6 Other Alternatives Considered

As part of the Air Force's decision-making process, three alternatives were considered but not carried forward for detailed analysis as they were determined infeasible since they did not meet the purpose and need for the proposed action, as described below.

### Alternative Energy Sources

Utilization of alternative energy sources was considered as a potential alternative. Locations on south Vandenberg AFB where solar technologies (e.g., building roof-mounted and ground-mounted solar collectors) could be installed for the generation of electricity were considered. However, these technologies would not produce adequate electricity to provide a reliable power source on south Vandenberg AFB. In addition to solar technologies, onsite generators would be required at the SLCs.

Wind energy technologies were also considered as an alternative power source. Although wind energy technologies are continually improving, this power source would not generate an adequate energy supply. Similar to solar technologies, onsite generators would be required at the SLCs to provide a reliable power source.

Time constraints associated with permitting requirements and lease agreements for onsite

generators could result in mission delays due to powerline failures. Furthermore, new powerlines would be required to transfer electricity from the generators. Therefore, this alternative would not meet the purpose and need of the proposed action and was eliminated from further analysis.

### **Direct Replacement**

An alternative was considered that included replacing the existing electrical lines in the same location. This alternative would replace the existing wires and electrical equipment on the original poles. However, this alternative would not provide a redundant power source (i.e., one line operable at all times) during construction, which would result in electrical service interruptions on south Vandenberg AFB. Therefore, this alternative was eliminated from further analysis.

### **Underground and In-Road Replacement**

An alternative was considered that included construction of an underground electrical system and the subsequent removal of the existing overhead electrical lines. This alternative would install electrical conduits below the surface of the existing roadways. However, due to the substantial cost associated with underground utility replacement, it would be economically infeasible to construct this alternative. Therefore, this alternative was eliminated from further analysis.

## **2.7 Preferred Alternative**

Alternative B is the preferred alternative because it is the only alternative that fulfills the purpose and need for the proposed action while avoiding adverse impacts on sensitive archaeological resources.

## Chapter 3. Affected Environment

### 3.1 Air Quality

Ambient air quality refers to the atmospheric concentration of a specific compound (i.e., amount of pollutants in a specified volume of air) that occurs in a particular geographic location. Ambient air quality levels at a particular location are determined by the interaction of emissions (e.g., type and amount of pollutant emitted into the atmosphere), meteorology (e.g., weather patterns affecting pollutant emissions), and chemistry (e.g., chemical reactions that transform emissions into other substances). Air quality in a given location is defined by pollutant concentrations in the atmosphere which are generally expressed in units of parts per million (ppm) or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards for seven major pollutants of concern (i.e., criteria pollutants), established by the USEPA, are termed the National Ambient Air Quality Standards (NAAQS). Areas that violate a federal air quality standard are designated as non-attainment areas.

California standards, established by CARB, are termed the California Ambient Air Quality Standards (CAAQS). CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist. In addition to the federal criteria pollutants, California has identified four other pollutants for ambient air quality standards. Areas within California that have ambient air concentrations of a pollutant higher than a federal and/or state standard are designated as non-attainment areas for that pollutant.

Table 3.1-1 summarizes the federal and state ambient air quality standards for regulated pollutants.

Toxic air contaminants include air pollutants that can cause serious illnesses or increased mortality, even in low concentrations. Toxic air contaminants are compounds that generally have no established ambient standards, but are known or suspected to cause short-term (acute) and/or long-term (chronic non-carcinogenic or carcinogenic) adverse health effects. The CARB designates diesel particulate matter from the combustion of diesel fuel as a toxic air contaminant.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone ( $\text{O}_3$ ), carbon monoxide (CO), nitrogen oxides ( $\text{NO}_x$ ), particulate matter less than 10 microns in diameter ( $\text{PM}_{10}$ ), and particulate matter less than 2.5 microns in diameter ( $\text{PM}_{2.5}$ ). Although VOCs or  $\text{NO}_x$  (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to  $\text{O}_3$  and  $\text{PM}_{2.5}$  formation.

#### 3.1.1 Regional Setting

The climate of the project area is Mediterranean, characterized by warm, dry summers and mild, relatively damp winters. The major influence of the regional climate is the Pacific Ocean and the Eastern Pacific High, a strong persistent atmospheric high-pressure system. Over 90 percent of the total annual precipitation in the project area occurs from polar storm systems that frequent the area during the months of November through April. The average annual precipitation is approximately 14 inches (National Oceanic and Atmospheric Administration 2011). Due to the proximity of the project site to the coastline, marine air from the Pacific Ocean has a strong moderating effect on air temperatures at this location. The high and

Table 3.1-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS <sup>a</sup> Primary Standard <sup>b,c</sup>	NAAQS <sup>a</sup> Secondary Standard <sup>b,d</sup>	CAAQS
Ozone, O <sub>3</sub> (ppm)	1 hour	--	--	0.09
	8 hours	0.075	Same as Primary	0.07
Carbon monoxide, CO (ppm)	1 hour	35	None	20
	8 hours	9	None	9
Nitrogen dioxide, NO <sub>2</sub> (ppm)	1 hour	0.10	--	0.18
	Annual	0.053	Same as Primary	0.03
Sulfur dioxide, SO <sub>2</sub> (ppm)	1 hour	--	--	0.25
	24 hours	0.14	--	0.04
	Annual	0.03	--	--
Respirable Particulate Matter (PM <sub>10</sub> ) (µg/m <sup>3</sup> )	24 hours	150	Same as Primary	50
	Annual	--	--	20
Fine Particulate Matter (PM <sub>2.5</sub> ) (µg/m <sup>3</sup> )	24 hours	35	Same as Primary	--
	Annual	15	Same as Primary	12
Lead, Pb (µg/m <sup>3</sup> ) <sup>e</sup>	Calendar Quarter	1.5	Same as Primary	--
	Rolling 3-month average	0.15	Same as Primary	--
	30 day average	--	--	1.5
Vinyl chloride (ppm) <sup>e</sup>	24 hour	--	--	0.01
Sulfates (µg/m <sup>3</sup> )	24 hour	--	--	25
Hydrogen Sulfide, H <sub>2</sub> S (ppm)	1 hour	--	--	0.03
Visibility Reducing Particles	8 hour	--	--	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: CARB 2010a.

Notes:

- a Standards other than the 1-hour ozone, 24-hour PM<sub>10</sub>, 24-hour PM<sub>2.5</sub>, and those based on annual averages are not to be exceeded more than once a year. The 8-hour ozone national standard has replaced the 1-hour ozone national standard.
- b Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
- c Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that states implementation plan is approved by the USEPA.
- d Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- e The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

-- = no standard

low temperatures during the summer months average in the low 80s (degrees Fahrenheit) and low 50s, respectively. The high and low temperatures during the winter months average in the mid 60s and high 30s.

Vandenberg AFB is located within Santa Barbara County, which is within the South Central Coast Air Basin (SCCAB). The SCCAB is composed of the counties of San Luis Obispo, Santa Barbara, and Ventura.

The SBCAPCD is responsible for regulating stationary sources of air emissions in Santa Barbara County.

Presently, Santa Barbara County is in attainment/unclassified of all NAAQS for all criteria pollutants. Additionally, Santa Barbara County is in attainment/unclassified of all CAAQS except those for O<sub>3</sub> and PM<sub>10</sub> (CARB 2010b). Table 3.1-2 summarizes the county's attainment status.



Table 3.1-2. Santa Barbara County Air Quality Attainment Status

O <sub>3</sub>		CO		NO <sub>2</sub>		SO <sub>2</sub>		PM <sub>2.5</sub>		PM <sub>10</sub>	
State	Federal	State	Federal	State	Federal	State	Federal	State	Federal	State	Federal
N	U/A	A	U/A	A	U/A	A	U	U	U/A	N	U

Source: (USEPA 2010 and CARB 2010b).  
Notes: A=Attainment; N=Non-Attainment; U/A=Unclassified/Attainment; U=Unclassified.

The CARB and SBCAPCD operate a network of ambient air monitoring stations in Santa Barbara County. The purpose of the monitoring stations is to measure ambient concentrations of air pollutants and determine whether air quality meets the CAAQS and the NAAQS. The nearest air monitoring station to the project site is the Vandenberg AFB station, which measures all criteria pollutants except PM<sub>2.5</sub>. The only monitoring stations within Santa Barbara County that have monitored PM<sub>2.5</sub> for the period 2007 through 2009 are located on Broadway Street in Santa Maria and at 700 East Canon Perdido Street in Santa Barbara. The South H Street station in Lompoc measures all criteria pollutants and began monitoring PM<sub>2.5</sub> in 2007. A summary of the maximum air pollutant concentrations measured within the project region over the last 3 years are presented in Table 3.1-3.

These data show that from 2007 through 2009, the region exceeded the (1) state 8-hour ozone standard in 2008 and 2009, (2) state annual PM<sub>10</sub> standard in 2008 and 2009, (3) state 24-hour PM<sub>10</sub> standard in 2009, and (4) national 24-hour PM<sub>2.5</sub> standard in 2008. The region attained all other air pollutant standards during this period.

### 3.1.2 Greenhouse Gas Emissions

GHGs are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to

Table 3.1-3. Ambient Air Quality at Vandenberg AFB

Pollutant	Averaging Time	2007	2008	2009	CAAQS (ppm)	NAAQS (ppm)	Monitoring Station
Ozone	8 hour	0.062	0.074	0.074	0.070	0.075	Lompoc <sup>1</sup>
PM <sub>10</sub>	Annual Arithmetic Mean	19.6 µg/m <sup>3</sup>	20.9 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	-	Lompoc <sup>1</sup>
	24 hour	37.8 µg/m <sup>3</sup>	47.7 µg/m <sup>3</sup>	62 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Lompoc <sup>1</sup>
PM <sub>2.5</sub>	Annual Arithmetic Mean	9.5 µg/m <sup>3</sup>	10.4 µg/m <sup>3</sup>	7 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	Canon Perdido
	24 hour	23.5 µg/m <sup>3</sup>	44.2 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>	-	35 µg/m <sup>3</sup>	Canon Perdido
NO <sub>2</sub>	Annual	0.005	0.003	0.004	0.030	0.053	Lompoc <sup>1</sup>
	1 hour	0.037	0.037	0.03	0.18	-	Lompoc <sup>1</sup>
CO	8 hour	1.18	1.06	0.71	9.0	9	Lompoc <sup>1</sup>
	1 hour	4.6	2.1	1.7	20	35	Lompoc <sup>1</sup>
SO <sub>2</sub>	Annual	0.000	0.000	N/A	-	0.030	Lompoc <sup>1</sup>
	24 hour	0.003	0.002	0.003	0.04	0.14	Lompoc <sup>1</sup>
	3 hour	0.005	0.003	N/A	-	0.5	Lompoc <sup>1</sup>
	1 hour	0.011	0.007	0.008	0.25	-	Lompoc <sup>1</sup>

Sources:  
[www.arb.ca.gov/adam](http://www.arb.ca.gov/adam) (for annual NO<sub>2</sub>, 8-hour CO, and 24-hour SO<sub>2</sub>).  
[www.epa.gov/air/data/monvals.html](http://www.epa.gov/air/data/monvals.html) (1-hour, 3-hour, and annual SO<sub>2</sub> data).  
<http://www.sbcapcd.org/sbc/agrpt.htm>, for O<sub>3</sub>, PM, and 1-hour CO and NO<sub>2</sub>.  
Note:  
1. South H Street

produce negative economic and social consequences across the globe.

Recent observed changes due to global warming include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (Intergovernmental Panel on Climate Change 2007). Predictions of long-term environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack. In California, global warming effects are predicted to include exacerbation of air quality problems, a reduction in municipal water supply from the Sierra snowpack, a rise in sea level that would displace coastal businesses and residences, damage to marine and terrestrial ecosystems, and an increase in the incidence of infectious diseases, asthma, and other human health problems (California Environmental Protection Agency [CalEPA] 2006).

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. Each GHG is assigned a global warming potential (GWP), which is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO<sub>2</sub>, which has a value of one. For example, CH<sub>4</sub> has a GWP of 21, which means that it has a global warming effect 21 times greater than CO<sub>2</sub> on an equal-mass basis. Total GHG emissions from a source are often reported as a CO<sub>2</sub> equivalent (CO<sub>2</sub>e). The CO<sub>2</sub>e is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs.

### 3.1.3 Applicable Regulations and Standards

Sources of air emissions in the SCCAB are regulated by the USEPA, CARB, and SBCAPCD. In addition, regional and local jurisdictions play a role in air quality management.

#### Federal Regulations

##### *Clean Air Act*

The CAA of 1970 and subsequent amendments specify regulations for control of the nation's air quality. The USEPA is responsible for implementing most aspects of the CAA. Basic elements of the act include the NAAQS for major air pollutants, hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, and enforcement provisions. The CAA regulates emissions of criteria pollutants and air toxics to protect human health and welfare.

Federal and state ambient air standards have been established for each criteria pollutant. The CAA delegates the enforcement of the federal standards to the states. In California, the CARB is responsible for enforcing air pollution regulations. In Santa Barbara County, the SBCAPCD has this responsibility.

The CAA establishes air quality planning processes and requires areas in non-attainment of a NAAQS to develop a State Implementation Plan (SIP) that details how the state will attain the standard within mandated time frames. The requirements and compliance dates for attainment are based on the severity of the non-attainment classification of the area.

##### *Executive Order 12088*

EO 12088, *Federal Compliance with Pollution Control Standards*, requires federal agencies to comply with applicable pollution control standards. The EO requires agencies to ensure that all necessary actions are taken to ensure the prevention, control, and

abatement of environmental pollution with respect to federal activities and facilities. EO 12088 also requires federal agencies to cooperate with USEPA, state, and local regulatory agencies.

#### **Executive Order 13423**

EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, was issued in 2007 to set goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, renewable energy, sustainable buildings, electronics stewardship, and water conservation. The EO set a goal to reduce GHG emissions by reducing energy intensity by 3 percent annually or 30 percent by 2015.

#### **Executive Order 13432**

EO 13432, *Cooperation Among Agencies in Protecting the Environment with Respect to Greenhouse Gas Emissions from Motor Vehicles, Nonroad Vehicles, and Nonroad Engines*, ensures the coordination between federal agencies to protect the environment with respect to GHGs emissions from vehicles, engines, and motor vehicle fuels. This EO requires the integration of environmental management into federal operations, policies, planning, and management.

#### **Executive Order 13514**

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, establishes sustainability goals for federal agencies. This EO requires federal agencies to increase energy efficiency, reduce GHG emissions, conserve water, reduce waste, support sustainable development, reduce petroleum consumption, and promote environmentally responsible products and technologies. Federal agencies are required to prepare and implement Strategic Sustainability Performance Plans identifying how they will meet the sustainability goals.

## **State Regulations**

### **California Clean Air Act**

The California Clean Air Act of 1988 outlines a program to attain the CAAQS for O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, and CO by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, attainment of the CAAQS will require more emission reductions than what will be required to show attainment of the NAAQS. Similar to the federal system, the state requirements and compliance dates are based on the severity of the ambient air quality standard violation within a region. In California, the CARB is designated as the responsible agency for all air quality regulations.

## **Local Regulations**

The SBCAPCD regulates stationary sources of air pollution and establishes emission limitations and control requirements for various sources, based upon their source type and magnitude of emissions. SBCAPCD requires projects constructing, altering, or replacing stationary equipment that may emit air pollutions or stationary sources of air pollutants to obtain permits. SBCAPCD is responsible for reviewing all applications and approving and issuing permits.

## **3.2 Biological Resources**

Federal agencies are required by Section 7 of the ESA of 1973, as amended (16 U.S.C. §§ 1531 to 1544), to assess the effect of any project on federally listed threatened and endangered species. Under Section 7, consultation with the USFWS and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries Service) is required for federal projects if such actions could directly or indirectly adversely affect listed species or destroy or adversely modify designated critical habitat. It is also Air Force policy to consider listed and special status species recognized by state agencies when evaluating impacts of a project.

Vandenberg AFB is located in a transitional ecological region that lies at the northern and southern distributional limits of many species, and contains diverse biological resources of considerable importance. The Base provides habitat for many federal and state listed threatened, endangered, and special concern plant and animal species.

### 3.2.1 Methodology

Potential occurrence of plant and wildlife species, including special status species, was determined based on field surveys conducted in the project vicinity, past documentation of special status species within the project vicinity, suitable habitat preferences, and known occurrence based on literature searches and other existing documentation. Sources used to determine potential occurrence include literature and Geographic Information System (GIS) maps of natural resources present at Vandenberg AFB. Special status species survey and location GIS maps were superimposed over the project area and intersecting occupied habitat was documented and/or reviewed.

### 3.2.2 Vegetation Types

The majority of the project area has been exposed to extensive disturbance from road and facility maintenance activities. Exotic species with the capacity to rapidly colonize disturbed areas dominate much of the project area.

Four native vegetation types were identified in the 104-acre disturbance area: ruderal, non-native grassland, central coast scrub/maritime scrub, and coastal bluff/dune scrub. Vegetation types are described in detail below. In nearly all areas, vegetation dominated by non-native species, including iceplant, acacia, Monterey pine, pampas grass and eucalyptus, or ruderal habitats comprise more than 50 percent of the project area.

#### Ruderal

Ruderal vegetation typically occurs at roadsides, waste areas, and other sites

continuously disturbed by activities such as traffic, road construction, and road maintenance. Annual, and usually non-native forbs and grasses that can rapidly invade disturbed areas, dominate ruderal vegetation types. Ruderal vegetation types border the existing roads with the project area and are dominated by low growing herbaceous species, including non-native iceplant, annual grasses, and forbs. Approximately 35 percent of pole removal activities and 90 percent of pole installation activities would be located within 5 -10 meters of existing roads.

#### Non-native Grassland

Non-native grassland is common in areas subject to prior disturbance, allowing weedy non-native species to invade and become dominant. Within the project area iceplant and non-native annual species (e.g., pampas grass, acacia, black mustard, Monterey pine, and eucalyptus) dominate this plant community. A small portion of Feeder Lines N1 and N3 follows a paved road, adjacent to a field that is grazed by cattle. Approximately 25 percent of the project area is comprised of non-native grasslands.

#### Central Coast Scrub/Maritime Scrub

Central coast scrub/maritime scrub is a diverse community that occupies a narrow corridor extending along almost the entire coast of California. Shallow-rooted, mesophylllic plant species that are often drought-deciduous and summer-dormant characterize this community. Approximately 35 percent of the project area contains these vegetation types. Past disturbances have facilitated the establishment of many non-native species within this vegetation community. Within the project area, native species including California sagebrush and coyote brush dominate this vegetation type. Herbaceous species such as grassland tarplant may be present in clearings between shrubs. Seacliff buckwheat, the host plant for the federally endangered El Segundo blue butterfly, occurs within this plant community in generally sparse distribution.

### Coastal Bluff/Dune Scrub

Approximately 5 percent of the project area contains these vegetation types. Native species in this habitat include seacliff buckwheat, coyote brush, dune lupine, dudleya, giant coreopsis, and croton. Equally important to this ecosystem are the small sections of open sand. Beach layia (listed as federally and state endangered) is located in this habitat, within sandy openings in the central dune scrub vegetation community. Previous biological surveys found more than 90 percent of beach layia locations to be either north or south of the project area within the dune scrub area (Figure 3.2-1).

### 3.2.3 Wildlife Species

The vegetation types present within the project area provide habitat for many common wildlife species. Birds commonly associated with coastal scrub and grassland vegetation types include house finch, European starling, and western scrub-jay. Nesting native birds such as spotted towhees and wrenit would also be expected to utilize these sites.

Pacific treefrog are likely to be the most common amphibian species within the project area, but California red-legged frog, western toad, and lungless salamanders such as the Monterey ensatina and arboreal salamander would also be expected to occur. The California red-legged frog is federally listed as threatened and a California Species of Concern (refer to Section 3.2.4).

Reptile species expected within the project area include western fence lizard, southern

alligator lizard, western skink, San Diego gopher snake, southern pacific rattlesnake, and coast horned lizard.

A variety of mammal species are also expected to occur within the project area. These include brush rabbit, coyote, and black-tailed deer. Small mammals include various species of mice and valley pocket gopher.

### 3.2.4 Special Status Species

Two special status species, beach layia (listed as federally and state endangered) and California red-legged frog (listed as federally threatened and a California Species of Concern), are known to occur within the project area. Gaviota tarplant (listed as federally and state endangered) occurs near portions of the project area adjacent to SLC-6 and possibly SLC-5 (inactive). Seacliff buckwheat, the host plant for the federally endangered El Segundo blue butterfly, occurs within the project site. Table 3.2-1 lists the federal and state threatened and endangered species and other special status species that occur or have the potential to occur in the project area.

As of October 2010, the entire project area is considered to be in “not known to be occupied” habitat for the federally endangered El Segundo blue butterfly. However, seacliff buckwheat occurs sparsely throughout the project area. One locality of one individual El Segundo blue butterfly is located approximately 0.5 mile to the north of the project area; a more significant population of the El Segundo blue butterfly is located on and near Honda Ridge, approximately 1.8 miles from the project site.

Table 3.2-1. Special Status Plant and Wildlife Species within the Project Area

Scientific Name Common Name	Status		Occurrence	Habitat	Comments
	USFWS <sup>1</sup>	CDFG <sup>2</sup>			
Plants					
Beach layia	FE	SE	Documented	Coastal sand dunes	Blooms April - June
Gaviota tarplant	FE	SE	Potential	Grassland, ruderal	Blooms June - September
Amphibians					
California red-legged frog	FT	CSC	Documented	Perennial ponds and streams	Breeds February - April
Invertebrates					
El Segundo blue butterfly	FE		Potential	Coastal sand dunes	Adult flight period June - September
Notes:					
1 FE = Federal Endangered Species; FT = Federal Threatened Species					
2 SE = California Endangered Species; CSC = California Species of Concern					





Figure 3.2-1. Potential Beach Layia Habitat in the Project Vicinity



## Beach Layia

Beach layia is known to occur in five dune systems along the California coastline: in northern Santa Barbara County, on the Monterey Peninsula, at Point Reyes in Marin County, and in two dune systems in Humboldt County.

Beach layia is a small, succulent, annual herb with low spreading branches and heads of small, white to pink ray flowers and yellow disk flowers. On Vandenberg AFB, it grows within sandy openings in the central dune scrub vegetation community. The leaves and branches have sticky glands that allow sand to adhere to the plant. This species is threatened by competition from non-native vegetation, loss of habitat from development, and habitat disturbance from recreation and grazing. Beach layia was listed as federally endangered on 22 June 1992 (57 Federal Register [FR] 27848) and state endangered in January 1971. No critical habitat has been published for beach layia.

This winter annual germinates during the rainy season from fall to mid-winter, blooms in spring (April to June), and completes its life cycle before the dry season. There are large annual fluctuations in the size and distribution of populations of beach layia. Colonies often occur where sparse, open vegetation traps wind-dispersed seeds, but causes minimal shading.

In 2010, beach layia surveys were conducted on Vandenberg AFB, including the project area. Approximately 629 acres were surveyed and 2,996 beach layia plants were documented. These surveys revisited historic localities and documented eight new locations, including one new stand east of Coast Road and south of Kelp Road adjacent to the project area (Vandenberg AFB 2010).

## California red-legged frog

The California red-legged frog is the largest native frog in the western U.S. It once ranged across much of California, including portions of the Sierra Nevada Mountain Range. The

present distribution ranges from Sonoma and Butte Counties (in the north) to Riverside County (in the south), where they occur primarily in wetlands and streams in coastal drainages of central California.

The USFWS listed this species as federally threatened on 23 May 1996 (61 FR 25813) and designated critical habitat on 13 April 2006 (71 FR 19243). Vandenberg AFB was excluded from the critical habitat designation under section 4(b)(2) of the ESA. The Final Rule for Revised Designation of Critical Habitat published on 17 March 2010 (75 FR 12816) also exempted Vandenberg AFB from critical habitat designation under section 4(b)(2) of the ESA. As a result, the proposed action is not in critical habitat for California red-legged frog.

California red-legged frogs occur in nearly all permanent streams and ponds on Vandenberg AFB. California red-legged frogs occur in different habitats depending on their life stage, the season, and weather conditions. All life stages are most likely to be encountered in and around breeding sites, which are known to include coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as bodies of water confined within an enclosure such as stock ponds, irrigation ponds, and siltation ponds. Dense, shrubby, or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows are considered optimal breeding habitat. California red-legged frogs breed from November to April, usually laying egg masses during or shortly following large rainfall events from late December to late April.

California red-legged frogs require aquatic habitat for breeding and cover but also use a variety of other habitat types including riparian and upland areas during periods of wet weather, starting with the first rains of fall. Yearly rainfall patterns may affect the breeding season duration in perennial streams on Vandenberg AFB due to the

availability of deep water pools. Areas not suitable for breeding may function as foraging habitat or refuge for dispersing frogs. California red-legged frogs often disperse from their breeding habitat as water levels fall below approximately 1 meter, finding cover in upland areas under brush. Adult frogs that have access to permanent water will generally remain active throughout the year. California red-legged frogs are known to disperse as far as 1.8 miles from breeding habitat (Bulger et al. 2003).

No project-specific surveys were conducted for California red-legged frogs. However, this species is known to be present in Cañada Honda Creek and the wastewater holding areas near SLC-6 (Vandenberg AFB 2010).

### **El Segundo blue butterfly**

The El Segundo blue butterfly was listed by the USFWS as federally endangered on 1 June 1976 (41 FR 22041). The El Segundo blue butterfly occurs in coastal dune scrub habitat, along coastal bluffs, and in coastal scrub habitats. The adult flight period is generally from mid-June through late August or early September, and coincides with the blooming period of its host plant, seacliff buckwheat (Arnold 1978, 1983; Pratt and Ballmer 1993). Eggs are deposited on buckwheat flowers and buds where the larvae feed until maturation. Upon maturation larvae burrow into the soil and pupate, usually within the root and debris zone of the host plant (Mattoni 1992). Pupae remain in diapause until at least the following flight season. The number of adult butterflies that emerge in a given year is dependent on environmental conditions. The majority of the pupae may remain in diapauses if environmental conditions are not favorable (Pratt and Ballmer 1993).

The occurrence of El Segundo blue butterflies at Vandenberg AFB represents a significant extension of the butterfly's geographic range. It was originally thought to be restricted to remnant habitat patches from Playa del Rey to the Palos Verdes Peninsula in Los Angeles County, California (Arnold 1978, 1981).

The El Segundo blue butterfly has been documented at four locations on Vandenberg AFB, including Tranquillon Peak, along north Spur Road (near San Antonio Creek and the railroad overpass), and near south Spur Road (west of the Taurus launch facility). Additionally, a single El Segundo blue butterfly was detected near the intersection of Coast Road and Bear Creek Road in summer 2008 (unpublished data). The species was generally found in coastal back dune habitats and central coast scrub. Known occupied habitat for El Segundo blue butterfly on Vandenberg AFB is 801 acres.

Between 2007 and 2010, several areas on Vandenberg AFB, including the project area, were surveyed for the presence of seacliff buckwheat and El Segundo blue butterflies. Although none of the project area occurs within known occupied habitat, the area is considered potential habitat due to the presence of seacliff buckwheat (Vandenberg AFB 2010).

### **Gaviota tarplant**

Gaviota tarplant was listed as federally endangered on 20 March 2000 (65 FR 14888-14898). USFWS designated critical habitat for Gaviota tarplant on 7 November 2002 (67 FR 67968). However, Vandenberg AFB was excluded from this designation under section 4(b)(2) of the ESA. As a result, the proposed action is not located in critical habitat.

No project-specific surveys were conducted for this species. In 2010, Gaviota tarplant surveys were conducted within potential habitat adjacent to the project site. No individuals of this species were identified in the project area. However, this species is known to occur on the bluffs around Point Arguello and suitable habitat for the Gaviota tarplant occurs near portions of the project area adjacent to SLC-6 and possibly SLC-5 (inactive) (Vandenberg AFB 2010; USFWS 2011).



### 3.2.5 Waters of the U.S. and Wetlands

Under Section 404 of the CWA, wetlands are defined as areas that are “inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include swamps, marshes, bogs, and similar areas (USEPA, 40 CFR 230.3 and USACE, 33 CFR 328.3). Waters of the U.S. most commonly encompass navigable waters bound by the ordinary high water line, adjacent wetlands, and relatively permanent tributaries. EO 11990, dated 24 May 1977 and amended by EO 12608 on 9 September 1987, requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to enhance their natural and beneficial values.

No project-specific wetland delineation surveys were conducted for the proposed action. However, based on review of aerial photos and understanding of the project area, it is likely the drainage features that traverse the project site could be considered jurisdictional by the United States Army Corps of Engineers (USACE) and other waters of the U.S. Cañada Honda Creek, located north of Honda Ridge Road, is a substantial drainage in the project area that flows directly to the Pacific Ocean. A small unnamed drainage that flows into the Pacific Ocean is located just south of Cañada Honda Creek approximately 300 feet south of Honda Ridge Road. Another small unnamed drainage that flows into the Pacific Ocean is located approximately 1,000 feet south of Tank Road. Grey Canyon and Red Roof Canyon, located approximately 850 feet south of Skyview Road, are small drainages that traverse the project site. A small unnamed drainage is located adjacent to Road N south of SLC-6. Oil Well Canyon traverses the Tow Route approximately 1,200 feet south of the Coast Road/Tow Road intersection.

### 3.3 Cultural Resources

Cultural resources are districts, buildings, sites, structures, areas of traditional use, or objects with historical, architectural, archeological, cultural, or of scientific importance. They include archeological resources (both prehistoric and historic), historic architectural resources (physical properties, structures, or built items), and traditional cultural properties (those important to living Native Americans for religious, spiritual, ancestral, or traditional reasons).

The NHPA establishes national policy for protecting significant cultural resources that are defined as “historic properties.” The term “historic property” refers to any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the NRHP (36 CFR Part 800.16).

#### 3.3.1 Area of Potential Effects

The Area of Potential Effects (APE) of an undertaking is defined at 36 CFR 800.16(d) as “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist.” The APE for the proposed action was defined as a 60 meter (200 feet) wide corridor, centered on the power line alignment.

#### 3.3.2 Cultural Setting

The prehistory of California’s central coast spans the entire Holocene (the last 11,000 years) and may extend back to late Pleistocene times (which began about 1.6 million years ago and ended about 11,000 years ago). Excavations on Vandenberg AFB reveal occupations dating back 9,000 to 10,000 years (Glassow 1990, 1996; Lebow et al. 2001, 2006, 2007). These early occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994; Glassow 1996; Greenwood 1972; Moratto 1984). Human population density was low throughout the early and

middle Holocene (Lebow et al. 2007). Cultural complexity appears to have increased around 3,000–2,500 years ago (King 1981, 1990). At Vandenberg AFB, that interval also marks the beginning of increasing human population densities and appears to mark the shift from a foraging to a collecting land-use strategy (Lebow et al. 2006, 2007). Population densities reached their peak around 600–800 years ago, corresponding to the full emergence of Chumash cultural complexity (Arnold 1992).

People living in the Vandenberg AFB area prior to historic contact are grouped with the Purisimezo Chumash (Greenwood 1978; King 1984; Landberg 1965), one of several linguistically related members of the Chumash culture. In the Santa Barbara Channel area, the Chumash people lived in large, densely populated villages and had a culture that “was as elaborate as that of any hunter-gatherer society on earth” (Moratto 1984:118). Relatively little is known about the Chumash in the Vandenberg AFB region. Explorers noted that villages were smaller and lacked the formal structure found in the channel area (Greenwood 1978:520). About five ethnohistoric villages are identified by King (1984) on Vandenberg AFB, along with another five villages in the general vicinity. Diseases introduced by early Euroamerican explorers, beginning with the maritime voyages of Cabrillo in A.D. 1542–1543, substantially impacted Chumash populations more than 200 years before Spanish occupation began (Erlandson and Bartoy 1995, 1996; Preston 1996). Drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in A.D. 1769.

Vandenberg AFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods. The Mission Period began with the early Spanish explorers and continued until 1820. Mission La Purísima encompassed the Vandenberg area. Farming and ranching were the primary economic activities at the Mission. The Rancho Period

began in 1820 and continued until 1845. Following secularization in 1834, the Alta California government granted former mission lands to Mexican citizens as ranchos. Cattle ranching was the primary economic activity during this period. The Bear Flag Revolt and the Mexican War marked the beginning of the Anglo-Mexican Period (1845–1880). Cattle ranching continued to flourish during the early part of this period, but severe droughts during the 1860s decimated cattle herds. The combination of drought and change in government from Mexican to the U.S. caused substantial changes in land ownership. Sheep ranching and grain farming replaced the old rancho system. Increased population densities characterize the Americanization Period (1880–1915). Beginning in the late 1890s, the railroad provided a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching and farming continued during the early part of the period of Regional Culture (1915–1945), until property was condemned for Camp Cooke.

The Suburban Period (1945–1965) began with the end of World War II. In 1956, the army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed Cooke Air Force Base. Construction of missile launch complexes began in 1957 and in 1958 the Base had its first missile launch, the Thor, and was renamed Vandenberg AFB (Palmer 1999). The Base played a very important role in the Cold War, with every ballistic missile in the U.S. arsenal ground- and flight-tested at Vandenberg AFB and thousands of military personnel receiving training under operational conditions. In addition, the Base was the only place where military satellites could be safely launched into polar orbit and thus proved critical to the military space program during the Cold War (Nowlan et al. 1996).

### **3.3.3 Cultural Resources within the Project Area**

An archaeological site record and literature search for Feeder Lines N1, N3, and N6 was completed at the 30th CES/CEANC at

Vandenberg AFB. Background research included a review of archaeological literature, archaeological base maps, and cultural resource records. Previous archaeological studies and archaeological resources within 0.25 mile of the electrical distribution lines were identified during the record search. Data sources examined included the Base Comprehensive Plan GIS and U.S. Geological Survey topographic maps.

Feeder Lines N1, N3, and N6 cross an area of high archaeological site density; 114 archaeological sites and 45 isolated artifacts are recorded within 0.25 mile of the feeder lines. Of these, 34 sites and 2 isolated artifacts are within or immediately adjacent to the existing and/or proposed electrical distribution lines (Table 3.3-1).

Most archaeological sites within the project area are prehistoric or have prehistoric components, including a village, long-term residences, short-term residences, and special-use locations for gathering and/or processing resources. Historical sites include a railroad section house, a ranchstead, and a U.S. Coast Guard boathouse. Isolated artifacts include a flake that is within the Feeder Line N6 area (ISO-279), and a flake within the Feeder Lines N1 and N3 area (ISO-314). Site significance (i.e., eligibility for listing in the NRHP) has not been evaluated for 10 of the 34 sites; for purposes of the proposed action all 10 sites are assumed to be significant. Thirteen sites have been officially determined eligible for the NRHP, in consultation with SHPO and 11 have been determined ineligible. Therefore, 23 of the 34 sites within or immediately adjacent to the proposed distribution lines have been determined eligible or are assumed to be eligible for listing in the NRHP for purposes of the proposed action.

### 3.4 Geology and Earth Resources

Vandenberg AFB is situated along the coastline in the Santa Maria basin. Vandenberg AFB is a geologically complex

area that includes the transition zone between the Southern Coast Range (on the northeast) and Western Transverse Range (on the south) geomorphic provinces. Extensive geological activity in the Vandenberg AFB region has created four structural regions: the Santa Ynez Range; the Lompoc lowland; the Los Alamos syncline; and the San Rafael Mountain uplift. Vandenberg AFB is characterized by generally northwest trending ridges and valleys. Major geologic features within Vandenberg AFB include the Santa Ynez Mountains, Casmalia Hills, Purisima Hills, Santa Ynez Valley Dune Complex, Sudden Flats, beaches, and rocky headlands. The Santa Ynez River and San Antonio Creek are the two major drainages that traverse Vandenberg AFB.

The near-surface geology in the project area consists of stream terrace and alluvial deposits of silt, sand, and gravel (Dibblee 1988).

#### 3.4.1 Soils

Vandenberg AFB is characterized by coastal sand dunes and alluvium (i.e., sediment deposited by flowing water). Vandenberg AFB is underlain predominately by marine sedimentary rocks (e.g., shales and limestone) of Late Mesozoic period (140 to 70 million years before the present) and Cenozoic period (70 million years to the present). Basement rocks underlying Vandenberg AFB is the Franciscan Formation, which consists of a series of sedimentary and volcanic rocks (Dibblee 1950).

The project site is underlain by Tangair-Narlon sands and Marina-Oceano sands. The Tangair-Narlon association is located on moderate to strongly sloping terrain and is generally characterized as poorly drained and moderately well drained sands and loamy sands. The Marina-Oceano association comprises drained sands on mesas and dunes (Vandenberg AFB 2011).

Table 3.3-1. Archaeological Sites within the Study Area

Site CA-SBA-	Site Type <sup>1</sup> /Description	Feeder Line	NRHP Eligibility <sup>2</sup>	Archaeological Studies Beyond Recordation
0537	Location/lithic scatter	N6	Eligible	Glassow et al. 1976; Schilz 1985; Moore et al. 1988; Environmental Solutions et al. 1988; Environmental Solutions 1990a; Schmidt and Bergin 1990; Lebow et al. 2005.
0538	Location/ lithic scatter	N6	Ineligible	--
0551	Long-term residence/ dense shell midden	N1, N3	Eligible	Glassow et al. 1976; Environmental Solutions 1990b:6-2; Lebow et al. 2003.
0636	Short-term residence/ marine shell scatter	N1, N3	Unevaluated	Environmental Solutions 1989.
0639	Long-term residence/ moderately dense shell midden	N1, N3	Unevaluated	Carbone and Mason 1998; Lebow and Ryan 2006; Enright and Lebow 2011.
0643/H	Long-term residence/ dense shell midden, with a historical component	N1, N3	Unevaluated	Lebow and Ryan 2006; Enright and Lebow 2011.
0647	Quarry/ lithic scatter	N1, N3	Eligible	Stone and Gamble 1981; Doyle et al. 1996.
0654	Long-term residence/ lithic scatter, shell scatter	N1, N3	Eligible	Glassow et al. 1976; Environmental Solutions 1990b.
0662	Village/ dense shell midden	N1, N3	Eligible	Spanne and Glassow 1974; Glassow et al. 1981; Gibson 1986; Glassow 1990; Environmental Solutions 1990c; Lebow and Ryan 2006; Enright and Lebow 2011.
0670	Long-term residence/ dense shell midden	N6	Eligible	Glassow et al. 1976; Glassow 1981, 1990, 1996; Spanne 1980; Stone and Glassow 1980; Schilz 1985; Ferraro et al. 1988; Moore et al. 1988; Environmental Solutions 1990b; Lebow 2001; Lebow et al. 2003; Enright and Lebow 2011.
0676/H	Ranchstead/ Hansen homestead.	N6	Eligible	Moore et al. 1988:7-9-7-10; Lebow 2001:6.12; Lebow et al. 2003.
1106	Location/ small, low-density artifact scatter	N1, N3	Ineligible <sup>3</sup>	Glassow et al. 1976:91; Enright and Lebow 2011.
1107	Small historical dump	N1, N3	Ineligible <sup>3</sup>	Glassow et al. 1976:92; Enright and Lebow 2011.
1114	Location/ lithic scatter	N1, N3	Ineligible <sup>3</sup>	Moratto et al. 2009.
1119	Short-term residence/ shell midden	N6	Eligible <sup>3</sup>	Lebow et al. 2009.
1122/H	Location/ marine shell scatter	N6	Ineligible	Moore et al. 1988:7-11; Lebow (2001).
1124H	Location/ small scatter of marine shell and historical artifacts	N6	Ineligible	Moore et al. 1988:7-11; Lebow (2001).
1145/H	Railroad Section House	N6	Eligible	Gibson 1983, 1985; Schilz 1985; Maschner et al. 1991; Snethkamp and Munns 1991; Lebow 2001; Nettles and Hamilton 2008.
1149/H	Location/ lithic scatter/ historic ranch	N1, N3	Unevaluated	Environmental Solutions et al. 1988, 1989.
1542	Quarry/ lithic scatter	N1, N3	Eligible	Craig and Glassow 1978; Glassow and Kornfeld 1981; Rudolph 1984; Harro and Gerber 1999; Enright and Lebow 2011.
1544	Short-term residence/shell midden	N1, N3	Eligible	Glassow and Kornfeld 1981.
1547	Long-term residence/shell midden	N1, N3	Eligible	Craig and Glassow 1978.

Table 3.3-1. Archaeological Sites within the Study Area (continued)

<b>Site CA-SBA-</b>	<b>Site Type<sup>1</sup>/Description</b>	<b>Feeder Line</b>	<b>NRHP Eligibility<sup>2</sup></b>	<b>Archaeological Studies Beyond Recordation</b>
1559	Location/ artifact scatter	N1, N3	Unevaluated	--
1560	Location/ artifact scatter	N1, N3	Unevaluated	--
1561	Location/ artifact scatter	N1, N3	Unevaluated	--
1678	Location/ artifact scatter	N1, N3	Ineligible <sup>3</sup>	Crisologo 1981:2-2; Spanne 1982; Berry 1989; Lebow et al. 2003.
1686	Location/ lithic scatter	N1, N3	Unevaluated	Serena 1981; Spanne 1984.
1940	Location/ small lithic scatter	N6	Ineligible <sup>3</sup>	Moore et al. 1988.
2219	Location/ lithic scatter	N1, N3	Ineligible <sup>3</sup>	Gibson 1986; Crisologo 1981:2-3; Environmental Solutions 1990c: 4-39; Gerber and Eisentraut 1994; Price 1995.
2222	Location/ marine shell scatter	N1, N3	Unevaluated	--
2230	Location/ lithic scatter	N6	Ineligible	Environmental Solutions 1990d; Lebow 2001.
2231/H	Long-term residence/ artifact scatter	N6	Ineligible <sup>3</sup>	Environmental Solutions 1990d.
2920H	Debris scatter/ historic debris scatter	N6	Unevaluated	--
3547H	Coast Guard Boathouse	N1, N3	Eligible	--
<b>Notes:</b> 1 Site type from Volume 5 of Vandenberg AFB's Integrated Cultural Resources Management Plan (Lebow and Moratto 2005). 2 NRHP = National Register of Historic Places. Eligible or ineligible refers to a formal determination of NRHP eligibility in consultation with the California SHPO. All unevaluated sites are assumed to be eligible for the NRHP. 3 SHPO concurred with Vandenberg AFB's determination for the proposed action. -- No archaeological studies beyond recordation have been completed.				

### 3.4.2 Faulting and Seismicity

The California Geological Survey (CGS), formerly known as the California Division of Mines and Geology (CDMG), classifies faults as either active or potentially active, according to the Alquist-Priolo Special Studies Zone Act of 1972. A fault that has exhibited surface displacement within the Holocene Epoch (the last 11,000 years) is defined as active by the CGS. A fault that has exhibited surface displacement during the Pleistocene Epoch (which began about 1.6 million years ago and ended about 11,000 years ago) is defined as potentially active. Pre-Pleistocene faults are considered inactive. The CGS has established Alquist-Priolo Special Study Zones around faults identified by the State Geologist as being active. The Alquist-Priolo Special Studies Zone Act limits development along the surface trace of active faults to reduce the potential for structural damage and/or injury due to fault rupture. The CGS also suggests that active faults, located within a 60 mile (96 km) radius of a project site, be evaluated with respect to regional seismicity (CDMG 1999, 1994).

Santa Barbara County is a seismically active region with a major earthquake occurring in the region about every 15 to 20 years (USAF 1987; Alterman et al. 1994). The project site is not underlain by any potentially active faults, active faults, or Alquist-Priolo Special Study Zones (CDMG 1999, 1994). However, three active fault zones that could cause ground motion or produce secondary effects traverse Vandenberg AFB: the Santa Ynez-Pacifico Fault Zone; the Lompoc-Solvang (Santa Ynez River)-Honda Fault Zone; the Lions Head-Los Alamos-Baseline Fault Zones, and their potential offshore extensions (Alterman et al. 1994; Jennings 1994).

### 3.4.3 Geologic Hazards

No active faults traverse the project site; therefore, the potential for surface fault rupture is low. The primary geologic hazard at the project site is strong seismically

induced ground shaking. There are no known areas within the project area where liquefaction has occurred. The areas most prone to liquefaction on Vandenberg AFB are near San Antonio Creek and the Santa Ynez River. The potential for liquefaction on Vandenberg AFB, despite these areas, is considered low (USAF 1987).

## 3.5 Land Use and Coastal Zone Resources

Vandenberg AFB is located on approximately 99,100 acres along the coastline in Santa Barbara County (Figure 1-1). Situated within an unincorporated part of the county, Vandenberg AFB is located northwest of the City of Santa Barbara and south of the City of San Luis Obispo. Although the project site is located within Santa Barbara County, the local government does not have any jurisdictional authority over land use on Vandenberg AFB because it is a federal military facility. General land uses at Vandenberg AFB include administrative, AETC (space and missile training area), agriculture/grazing, airfield, community (commercial and service), housing, industrial, launch operations, medical, open space, outdoor recreation, and water/coastal (Vandenberg AFB 2009).

The project site is situated along the coastline on south Vandenberg AFB. The surrounding coastline is predominately undeveloped with the exception of launch operation support facilities associated with SLC-4 and SLC-6 and utility infrastructure (e.g., existing electrical distribution lines and Substation N/power plant). Surrounding land uses to the north, east, and south include agricultural/grazing and open space.

### Coastal Zone Management

#### *Coastal Zone Management Act*

In 1972, Congress passed the CZMA to “preserve, protect, develop, and where possible, to restore or enhance, the resources of the nation’s coastal zone for this and succeeding generations” and to “encourage

and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone” [16 U.S.C. 1452, Section 303(1) and (2)].

The proposed action is subject to a federal Coastal Zone Consistency Review because it would involve activities within the coastal zone of California. On Vandenberg AFB, the coastal zone extends inland from approximately 0.75 miles at the northern boundary to 4.5 miles at the southern boundary. California has a federally approved Coastal Management Program, which includes the California Coastal Act (CCA).

The Air Force submitted a Negative Determination letter to the CCC on 9 May 2011 indicating that repairing and replacing electrical line Feeders N1, N3, and N6, would not affect natural, cultural and paleontological resources, access to the coast, or coastal scenic and visual qualities. Since the proposed action would not affect the coastal zone, the Air Force concluded the action does not require a consistency determination.

### 3.6 Noise

The Noise Control Act (42 U.S.C. 4901 *et seq.*) limits the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation

and construction sources, particularly near airport environments. The Noise Control Act also specifies that performance standards for transportation equipment be established with the assistance of the Department of Transportation. In addition, the 1987 Quiet Community amendment gives state and local authorities greater involvement in controlling noise.

#### 3.6.1 Noise Characteristics

Noise is commonly defined as unwanted sound. Sound is defined as pressure variations in air that the human ear can detect. The nature of sound can be characterized by its pitch or its loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Technical acoustical terms commonly used in this section are defined in Table 3.6-1.

#### 3.6.2 Sound Level and Frequency

Several noise measurement scales are used to describe noise. The decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. Zero on the decibel scale is based on the lowest sound pressure that a healthy, unimpaired human ear can detect. Sound levels in dBs are calculated on

Table 3.6-1. Definitions of Acoustical Terms

<b>Term</b>	<b>Definition</b>
Decibel (dB)	A dB is a unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for sound in air is 20 micro Pascals.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level ( $L_{eq}$ )	The average A-weighted noise level during the measurement period. The hourly $L_{eq}$ used for this report is denoted as dBA $L_{eq(h)}$ .
Ambient Noise Level	The ambient noise level is the composite of noise from all sources near and far, and represents the normal or existing level of environmental noise at a given location.

a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. There is a relationship between the subjective noisiness or loudness of a sound and its level. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a wide range of amplitudes. Since dB is a logarithmic unit, sound pressure levels are not added arithmetically. When two sounds of equal sound pressure level are added, the result is a sound pressure level that is 3 dB higher. For example, if the sound level were 70 dB when 100 cars pass by in a certain time period, then it would be 73 dB if 200 cars pass the observer during the same period. Doubling the amount of energy would result in a 3 dB increase to the sound level.

Frequency relates to the number of pressure oscillations per second, or Hertz (Hz). The range of sound frequencies that can be heard by healthy human ears is from about 20 Hz at the low end of the frequency spectrum to 20,000 Hz at the high end.

There are several methods for characterizing sound. The most common is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. The A-weighted level is closely correlated with annoyance caused by noise sources such as traffic and construction activity. Table 3.6-2 shows typical A-weighted noise levels that

occur in various indoor and outdoor environments.

### 3.6.3 Noise Descriptors

Because sound levels can vary over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations is utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called  $L_{eq}$ . The hourly  $L_{eq}$  used for this report is denoted as dBA  $L_{eq[h]}$ .

### 3.6.4 Human Response to Noise

It is widely accepted that sound pressure level changes of 3 dBA are considered just noticeable to most people. A change of 5 dBA is readily perceptible. An increase in sound pressure level of 10 dBA is perceived as being twice as loud, while a decrease of 10 dBA is perceived as being half as loud.

### 3.6.5 Existing Noise Sources

Noise in the vicinity of Vandenberg AFB results from vehicular transportation, industrial facility operations, construction activities, and railroad operations (e.g., Union Pacific and AMTRAK). In addition, periodic mission support activities (e.g., rocket launches and aircraft operations) create sporadic noise as dictated by the activity. In general, ambient

Table 3.6-2. Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
Jet fly-over at 1,000 ft	120	
	110	Rock concert
Pile driver at 100 ft	100	
Large truck passby at 50 ft	90	Night club with live music
Gas lawn mower at 50 ft	80	Noisy restaurant
	70	Vacuum cleaner at 10 ft
Commercial/Urban area daytime		Normal speech at 3 ft
Suburban daytime	60	Active office environment
Urban area nighttime	50	Quiet office environment
Suburban nighttime	40	
Quiet rural areas		
	30	Library
		Quiet bedroom at night
Wilderness area	20	
	10	Quiet recording studio
Threshold of human hearing	0	Threshold of human hearing

Source: Adapted from Caltrans 2008 in Noise Study Report Format Guidance Document.



$L_{eq1H}$  measurements on Vandenberg AFB range from around 35 to 60 dB (Thorson et al. 2001).

The project site and nearby vicinity are primarily exposed to noise generated by traffic from the surrounding roadways, with intermittent noise exposure from SLC operations and associated mission support activities. In addition, periodic railroad activities on the Union Pacific tracks located along the coastline between the north and south launch facilities and the Pacific Ocean are sources of noise in the project vicinity.

### 3.7 Public Health and Safety

A hazardous material or waste is a substance that due to its quantity, concentration, or chemical/physical characteristics, may present substantial risk to public health and welfare, workers, or the environment. Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (42 U.S.C. 9601-9675), Toxic Substances Control Act (15 U.S.C. 2601-2671), the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901-6992), and as defined in state laws and regulations.

Federal and state OSHA regulations govern protection of personnel in the workplace. All construction activities, facility operation, and maintenance on Vandenberg AFB are subject to federal OSHA regulations. In addition, California OSHA has jurisdiction over non-federal operations south of Honda Ridge Road on south Vandenberg AFB.

Vandenberg AFB is a secure, federal military installation. Access to Vandenberg AFB, including the project site, is controlled by the Air Force and restricted to military personnel and authorized contractors and visitors.

#### 3.7.1 Hazardous Materials Management

Approximately 5,000 hazardous materials are used at Vandenberg AFB to support mission activities. To ensure compliance with applicable regulations for the transport, handling, storage, use, and disposal of hazardous materials, all Air Force personnel and contractors that handle hazardous materials are required to comply with California Business Plan requirements. In addition, management of hazardous materials used on Vandenberg AFB follows procedures stipulated in the 30th Space Wing Plan (SWP) 32-7086, Hazardous Materials Management Plan. The Base HazMart maintains inventories of hazardous materials purchased by the Air Force and its contractors. Before releasing hazardous materials to the user, HazMart staff ensures a copy of the Material Safety Data Sheet is available and verifies that the material is suitable for use on Vandenberg AFB. By providing handling and use information, Vandenberg AFB controls the potential misuse of hazardous materials, maintains an accounting of the types of hazardous materials used on the Base, and prepares usage and emissions reports as required by federal, state and local regulations. In addition to Air Force requirements, Vandenberg AFB is subject to all federal, state, and local hazardous materials regulations, including inspection by federal, state and local regulatory agencies.

No hazardous materials may be brought on Vandenberg AFB without prior coordination, approval, and a tracking barcode issued by HazMart. All contractors must apply for a HazMart shop code and enroll in the Enterprise Environmental, Safety, and Occupational Health Information Management System (EESOH-MIS) hazardous materials authorization and tracking system.

Additionally, Vandenberg AFB has established health and safety requirements, including industrial hygiene and ground safety, to minimize potential risk to the general public and personnel. Industrial

hygiene is the joint responsibility of the 30 SW Safety Office (30 SW/SE) and the 30th Medical Operations Squadron, Bioenvironmental Engineering Element. Responsibilities include monitoring of exposure to workplace chemicals and physical hazards, hearing and respiratory protection, medical monitoring of workers subject to chemical exposures, and oversight of all hazardous or potentially hazardous operations. Ground safety is the responsibility of the 30 SW/SE and includes protection from hazardous situations, including physical hazards (i.e., holes and ditches, uneven terrain, sharp or protruding objects, unstable ground) and biological hazards (e.g., vegetation [poison oak and stinging nettle], animals [insects, spiders, and snakes] and disease vectors [ticks and rodents]).

Hazardous materials potentially used during construction and annual maintenance activities include petroleum, oil, and lubricants (POLs) in equipment and vehicles.

### 3.7.2 Hazardous Waste Management

Hazardous waste management at Vandenberg AFB complies with the Resource Conservation and Recovery Act Subtitle C (40 CFR Part 240-299) and with California Hazardous Waste Control Laws as administered by CalEPA, Department of Toxic Substances Control, under Title 22, and Division 4.5 of the California Code of Regulations (CCR). These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The Vandenberg AFB *Hazardous Waste Management Plan* (30 SWP 32-7043A) outlines hazardous waste management procedures.

An Air Force Generator Identification Number is used to account for hazardous wastes generated on Vandenberg AFB. Because of the amount of hazardous waste generated per month, Vandenberg AFB is classified as a large quantity, fully regulated generator, and

is required to comply with all federal, state, and local laws regulating the generation, storage, transportation, and disposal of hazardous waste. Vandenberg AFB uses a “cradle to grave” waste management approach. Generally, hazardous waste follows the 90-day accumulation rules as permitted by regulation, or is stored up to 270 days at authorized satellite accumulation points (SAPs). SAPs are located at the point of generation, and wastes may be stored until 55 gallons of hazardous waste or 1 quart of extremely or acutely hazardous waste is accumulated. When the satellite accumulation point (SAP) limit is reached, the waste is transferred in a properly labeled Department of Transportation approved container from its point of origin to the Consolidated CAP at Building 3300. All CAP and SAP managers require training prior to commencement of work. All hazardous waste is removed from Vandenberg AFB under a hazardous waste manifest, and shipped off-site for final disposal.

### 3.7.3 Installation Restoration Program

The federal Installation Restoration Program (IRP) was implemented at DoD facilities to identify, characterize, and restore hazardous substance release sites. There are currently 136 IRP sites throughout Vandenberg AFB grouped into six Operable Units based on similarity of their characteristics.

IRP sites are remediated through the Federal Facilities Site Remediation Agreement, a working agreement between the USAF, the Central Coast Regional Water Quality Control Board (RWQCB), and the Department of Toxic Substances Control. In addition to IRP sites, there are identified Areas of Concern (AOCs), where potential hazardous material releases are suspected; and Areas of Interest (AOIs), defined as areas with the potential for use and/or presence of a hazardous substance. Various contaminants could be present at these sites including trichloroethylene, PCBs, volatile organic compounds, total petroleum hydrocarbons (TPH), asbestos, and other hazardous

contaminants. There are eight open hazardous release sites, including two IRP sites, two AOCs, and four AOIs, located within the project area. In addition, there is one potential underground storage tank (UST) within the project area; however, no information is currently available for this site.

Two open IRP sites are located at SLC-4; SLC-4 West and the SLC-4 spring canyon pond. These areas are identified as IRP sites due to the presence of hazardous contaminants (i.e., waste rocket fuels) that have been neutralized and discharged to grade.

AOC-188b is associated with a leaking transformer located south of Facility 580. The hazardous material present onsite is TPH. AOC-188C, located northeast of Delphy Road and Facility 884, is associated with former hazardous materials storage sheds. This area is identified as an AOC site due to the presence of TPH; only fuel-related compounds are present onsite.

AOI-177 is a hazardous waste accumulation point located along Road N east of Lunar Road. The detected chemical of concern within this former hazardous waste storage area is TPH as diesel (TPH-d). AOI-263 is a wastewater storage tank located north and south of Road N, which includes seven buildings and a pole-mounted transformer. AOI-642 consists of Building 542, which was constructed in 1987 as a missile/space research engineering-launch complex shop facility. Chemicals of concern include TPH as diesel/motor oil (TPH-d/mo) and metals in soil and naphthalene in soil vapor. AOI-646 is a missile research facility located north of Lunar Avenue that includes one building and a transformer substation.

### 3.7.4 Unexploded Ordnance

Several areas on Vandenberg AFB were used as training ranges and have the potential to contain UXO. Since ordnance can be found in several areas on Base, all ground disturbing activities would be coordinated with the 30 SW/SEW to determine the UXO

technician support requirements. In the event UXO was discovered on the project site, it would not be disturbed. Workers would recognize, retreat, and contact the Explosive Ordnance Disposal (EOD) Flight. All UXO would be removed by authorized personnel.

## 3.8 Transportation

The circulation system adjacent to the project site consists of regional highways and arterial streets (i.e., major road used for through traffic). Regional access to Vandenberg AFB is provided by a network of freeways, including Highway 101, Highway 1, SR 135, and SR 246. Primary access to Vandenberg AFB is through three gates: the Santa Maria Gate (the main gate), Solvang Gate, and South Gate. The Santa Maria Gate provides access to the northern side of the cantonment area. The Solvang Gate provides access to north Vandenberg AFB and the South Base Gate provides access to south Vandenberg AFB.

Highway 101 is a four lane, north-south freeway and is the principal route between northern and southern California. Access between Vandenberg AFB and Highway 101 is provided via the Highway 1, SR 135, and SR 246 interchanges. Highway 1 is a north-south highway that provides direct access to Vandenberg AFB at the Santa Maria Gate. SR 135 is a two lane, east-west rural state highway that extends westward from Highway 101 and intersects with Highway 1 near Vandenberg AFB. SR 246 (West Ocean Avenue) is primarily a two lane, east-west rural highway that provides direct access to north Vandenberg AFB via the Solvang Gate and south Vandenberg AFB via the South Base Gate.

Roadways in the project vicinity are within Vandenberg AFB's jurisdiction. These roadways include Arguello Road, Surf Road, Coast Road, Honda Ridge Road, Lunar Avenue, Plato Road, Six Road, Kelp Road, Tank Road, Delphy Road, Road N, Point Road, and unnamed access roads, evacuation routes, and tow routes (Figure 3.8-1). The project site is accessible from

South Base Gate via West Ocean Avenue and Coast Road.

### 3.8.1 Roadway Operations

Exiting roadway conditions are evaluated based on roadway capacity and traffic volume. The capacity, which reflects the ability of the network to serve the traffic demand of a roadway, depends on the roadway width, number of lanes, intersection control, and other physical factors.

Level of Service (LOS) is used to characterize the overall traffic operations along a roadway. LOS A through F are used to rate roadway operations, with each level defined by a range of traffic volume to roadway capacity. LOS A, B, and C are considered good operating conditions with minor to tolerable delays experienced by motorists. LOS D represents below-average conditions. LOS E reflects a roadway at maximum capacity, and LOS F represents traffic congestion. Most roads on Vandenberg AFB operate at or better than the acceptable standard of LOS C (Vandenberg AFB 2009).

## 3.9 Visual Resources

### Visual Resources

Visual resources are generally defined as the natural and built features of the landscape visible from public views that contribute to an area's visual quality. This section describes the existing visual environment and changes resulting from the proposed action in order to characterize the aesthetic condition of the project site, including onsite structures and facilities, and assess how the condition potentially would be affected by implementation of the proposed action.

The evaluation of visual resources in the context of environmental analysis typically addresses the contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the proposed action's visual qualities to determine the

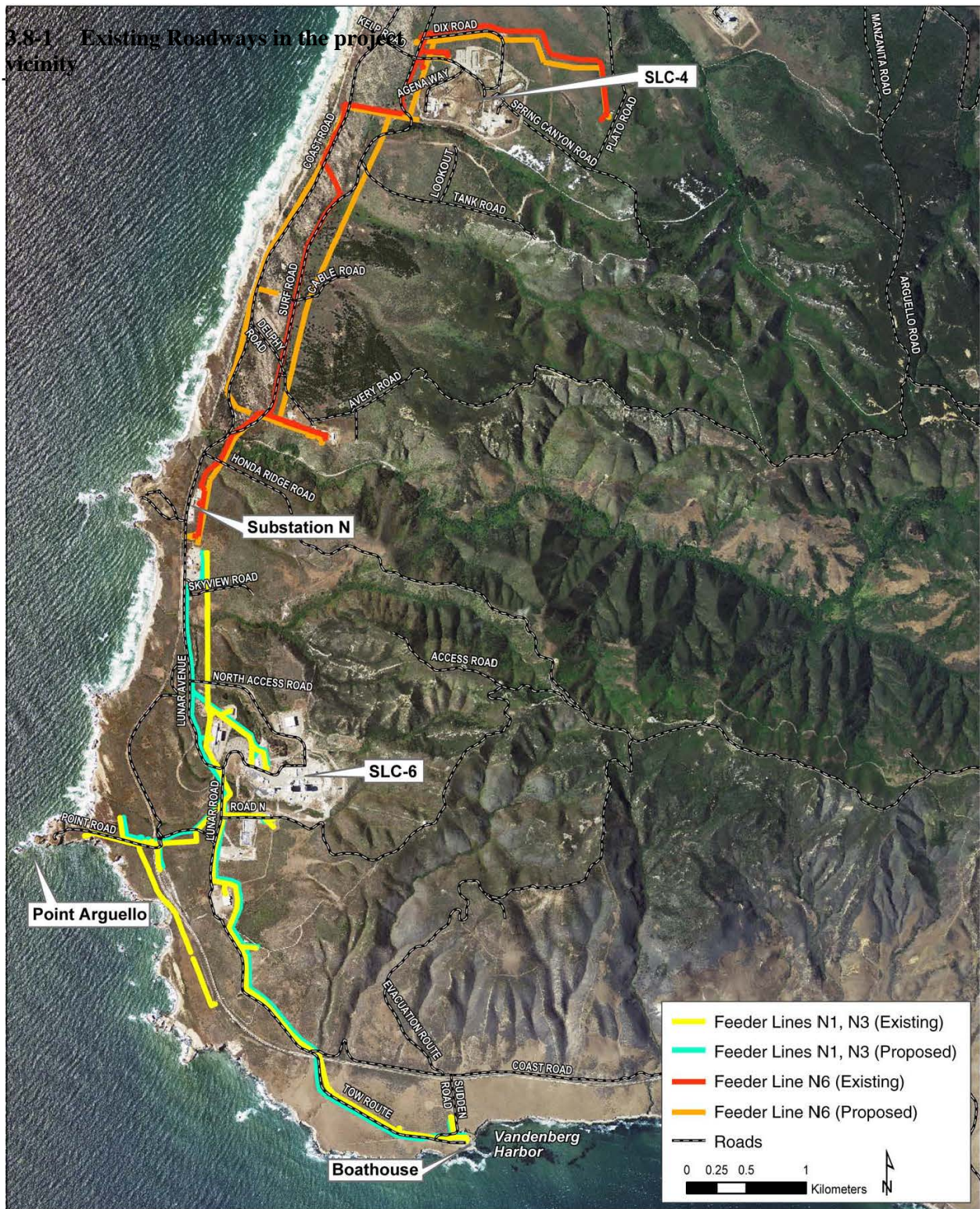
compatibility or contrast resulting from the buildout of the proposed action.

Views are defined as visual access to, or visibility of, a natural or built landscape feature from an observer viewpoint. Views may be focal (restricted in scope to a particular object) or panoramic (encompassing a large geographic area with a wide or deep [i.e., distant] field of view). Focal views can be from a number of observer viewpoints compared to the object being viewed, such as from a lower elevation, at the same level, or from an elevated vantage point. Panoramic views are usually associated with an elevated observer viewpoint. Scenic views or vistas are panoramic public views that include natural features including views of the ocean, unusual topographic features, or unique urban or historic structures.

Views are characterized by their distance from the viewer, including foreground, middleground, or background. Foreground views are those immediately perceived by the viewer and include objects at close range that tend to dominate the view. Middleground views occupy the center of the view and generally include objects that are the center of a viewer's attention if they are sufficiently large or visually contrasting with adjacent visual features. Background views include distant objects and other objects that form the horizon. Objects perceived in the background view eventually diminish in their importance with increasing distance. In the context of the background, the skyline can be an important visual context because objects above this point are highlighted against the typically blue background during daylight hours.

A viewshed, or visible area, is the total range of views experienced from an observer's viewpoint. A viewshed is defined by landscape features that define or obstruct sightlines, or the line of sight between an observer and a viewed object. Views may be partially or entirely obstructed by topography, buildings and structures, and/or vegetation.





**Figure 3.8-1. Existing Roadways in the Project Vicinity**



The closer an intervening obstruction is to the observer, the more it will potentially obstruct the viewshed. Accordingly, a small physical obstruction in the foreground of a view will potentially have a more substantial affect on the viewshed compared to a relatively large obstruction perceived in the middle or background.

### **Glare**

Glare, an indirectly caused phenomenon of lighting or reflection off building materials, can cause a negative impact during the day or night. Daytime glare is caused by the reflection of sunlight from highly reflective surfaces. Reflective surfaces are generally associated with buildings constructed with broad expanses of highly polished or smooth surfaces (e.g., glass or metal) or broad, light-colored paving surfaces such as concrete. Nighttime glare can include direct, intense, focused light, as well as reflected light. Glare can be caused by mobile, transitory sources such as automobiles, or from intense stationary sources including security lighting.

### **3.9.1 Visual Quality**

Vandenberg AFB is located on the south-central coast of California. The Base is located along 42 miles of undeveloped coastline and is situated between the Pacific Ocean to the west, the Casmalia Hills to the north, and the Santa Ynez Mountains and Sudden Flats to the south. The Base is characterized by rolling hills, canyons, creeks, sand dunes, and beaches. Vandenberg AFB includes several military and industrial facilities, including an airfield, launch pads, military support facilities, infrastructure, and ancillary facilities. The appearance of Base facilities is functional in nature, characterized by exposed infrastructure, open storage, and launch areas.

Existing views of the project site and surrounding lands contain several important physical visual attributes: undeveloped coastline, coastal bluffs, sandy beaches, sand dunes, undulating ridgelines, canyons, and the Cañada Honda Creek riparian corridor.

The project site is visible to individuals traveling on surrounding roadways (e.g., Coast Road, Surf Road, Honda Ridge Road, and Lunar Road). However, as views of the project site are restricted to military personnel and the project site is a component of the industrial Base complex, the importance of onsite visual resources is low.

### **3.9.2 Glare**

The absence of development throughout the project site results in a relatively low degree of nighttime lighting and glare. Existing industrial development at SLC-4 and SLC-6 is illuminated, resulting in moderate nighttime glare.

## **3.10 Water Resources**

The federal CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. The CWA and implementing USEPA regulations provide the authority and framework for state regulations. The California Porter-Cologne Water Quality Act provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. The Central Coast Water Quality Control Plan (Basin Plan) assigns beneficial uses to water bodies and provides local water quality objectives to protect these beneficial uses.

Section 303(d) of the federal CWA requires states to identify surface water bodies that are polluted (water quality limited segments). These surface water bodies do not meet water quality standards even after discharges of wastes from point sources have been treated by the minimum required levels of pollution control technology. There are no water bodies in the project area that are included on the CWA Section 303(d) List of Water Quality.

In California, the State Water Resources Control Board (SWRCB) administers the Porter Cologne Water Quality Act. The CWA mandates the National Pollutant Discharge

Elimination System (NPDES) program, which requires a permit for the discharge of any pollutant to waters of the U.S. from point and non-point sources. Non-point sources include stormwater runoff from industrial, municipal, and construction sites.

In California, the SWRCB and the RWQCB administer the NPDES Program for municipalities and construction activities through General Permits. The Central Coast RWQCB is the state agency responsible for the Vandenberg AFB area.

The NPDES Municipal General Permit prohibits discharges of material other than stormwater to waters of the U.S. and requires implementation of BMPs to reduce pollutants in stormwater to the maximum extent practicable.

The NPDES Construction General Permit regulates construction sites of 1 or more acre and regulates the discharge of pollutants in stormwater to waters of the U.S.

On Vandenberg AFB, the 30th Civil Engineer Squadron, Asset Management Flight (30 CES/CEA) Environmental Quality, Water Resources Department reviews all requests for discharges of wastewater to grade (Discharge to Grade Program) to protect groundwater quality and comply with state water quality regulations. Wastewater that contains contaminants above certain levels may not be discharged to grade.

### 3.10.1 Surface Water

The major freshwater resources of the Vandenberg AFB region include six streams, comprising two major and four minor drainages. The major drainages are San Antonio Creek and the Santa Ynez River. The minor drainages include Shuman Creek, Bear Creek, Cañada Honda Creek, and Jalama Creek (Vandenberg AFB 2010).

Monthly stream flow on Vandenberg AFB generally corresponds to trends in precipitation, although minor increases in precipitation are not always reflected in the flows. Generally, peak rainfall occurs between November and April. Average annual precipitation is approximately 14 inches per year (National Oceanic and Atmospheric Administration 2011).

Cañada Honda Creek is the main tributary in the project area that flows directly to the ocean. Grey Canyon, Red Roof Canyon, and Oil Well Canyon are small drainages that traverse the project site. In addition, numerous small drainages also traverse the project site, including an unnamed drainage located approximately 300 feet south of Honda Ridge Road, an unnamed drainage located approximately 1,000 feet south of Tank Road, and an unnamed drainage located adjacent to Road N south of SLC-6. No project-specific surveys were conducted for the proposed action. However, it is likely the drainage features that traverse the project site could be considered jurisdictional by USACE as waters of the U.S.

The project site is not located within a 100-year floodplain.

### 3.10.2 Groundwater

Vandenberg AFB includes parts of two major groundwater basins and two sub-basins. Feeder Lines N1, N3, and N6 are located within the South Coast Hydrological Unit. Feeder Line N6 is partially located within the Cañada Honda Basin. Feeder Lines N1 and N3 are not located within a designated groundwater basin. These feeder lines are located on Monterey shale and are not hydrologically connected with the Cañada Honda Basin. Generally, the Monterey shale formation is not a significant source of municipal groundwater.

**This page intentionally left blank.**



## Chapter 4. Environmental Consequences

### 4.1 Air Quality

Potential air quality impacts due to the proposed alternatives were evaluated on the basis of their direct and indirect emissions. Significant air quality impacts would occur if implementation of an alternative would directly or indirectly:

- Expose people to localized (as opposed to regional) air pollutant concentrations that violate federal or state ambient air quality standards;
- Cause a net increase in a pollutant or pollutant precursor emission that exceeds relevant emission significance thresholds (such as the numerical values of major source thresholds for nonattainment pollutants);
- Conflict with adopted air quality management plan policies or programs; or
- Exceed caps (limits) as imposed by federal and state GHG regulations. These regulations are in the draft stage, but would likely be in place during project execution.

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. The SBCAPCD has not established criteria for assessing the significance of air quality impacts for NEPA purposes. However, since Santa Barbara County violates the state standard for PM<sub>10</sub>, dust mitigation measures are required for all discretionary construction activities regardless of the significance of the fugitive dust impacts based on the policies in the 1979 Air Quality Attainment Plan. Construction activities also must comply with the requirements of SBCAPCD Rule 345, Control of Fugitive Dust from Construction and Demolition Activities. Under Rule 345, construction, demolition, and/or earthmoving activities are prohibited

from causing discharge of visible dust outside the property line, and must utilize standard BMPs to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities.

If emissions exceed a significance threshold described above, further analysis of the emissions and their consequences would be performed to assess whether there was likelihood of a significant impact to air quality. The nature and extent of such analysis would depend on the specific circumstances. The analysis could range from simply a more detailed and precise examination of the likely emitting activities and equipment, to air dispersion modeling analyses. If proposed action emissions were determined to increase ambient pollutant levels from below to above a federal or state ambient air quality standard, these emissions would be significant.

#### 4.1.1 Alternative A: Proposed Action

Air quality impacts from activities due to the proposed repairs and replacement of the overhead electrical lines would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM<sub>10</sub>/ PM<sub>2.5</sub>) due to the operation of equipment on exposed soil. Construction activity data associated with each project alternative were used to estimate proposed combustive and fugitive dust emissions.

Factors needed to derive construction source emission rates were obtained from *Compilation of Air Pollution Emission Factors, AP-42, Volume I* (USEPA 1995), the *OFFROAD2007 Model* for off-road construction equipment (CARB 2006a), and the *EMFAC2007 Model* for on-road vehicles (CARB 2006b). Appendix A includes data and assumptions used to calculate proposed construction emissions.

Table 4.1-1 summarizes the emissions estimated for repairs and replacement of the overhead electrical lines under Alternative A.

Table 4.1-1: Proposed Emissions under Alternative A (Proposed Action) (Tons/Year)

	VOC	CO	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub> e
Construction Equipment	0.12	0.47	1.10	0.00	0.05	0.06	84.17
Fugitive Dust	-	-	-	-	1.06	0.10	-
<b>Total</b>	<b>0.12</b>	<b>0.47</b>	<b>1.10</b>	<b>0.00</b>	<b>1.11</b>	<b>0.16</b>	<b>84.17</b>
Significance threshold	25	25	25	25	25	25	25,000
Exceeds threshold?	No	No	No	No	No	No	No

These data show that proposed emissions would not exceed the significance thresholds for any criteria pollutant. As a result, proposed activities from Alternative A would produce less than significant air quality impacts.

### Greenhouse Gases and Global Climate Change

Emissions of GHGs are considered to have a potential cumulative impact on global climate. As shown in Table 4.1-1, Alternative A would incrementally increase emissions of CO<sub>2</sub> and other GHGs. Scientists are in general agreement that the Earth's climate is gradually changing and this change is due in part to emissions of CO<sub>2</sub> and other GHGs from manmade sources. The anticipated magnitude of global climate change is such that a significant cumulative impact on global climate exists.

On the issue of global climate change, however, there are no adopted federal plans, policies, regulations, or laws mandating reductions in the GHG emissions that cause global climate change. The climate change research community has not yet developed tools specifically intended to evaluate or quantify end-point impacts attributable to the emissions of GHGs from a single source. In particular, the impacts to climate change from the very minor incremental increase in GHGs from Alternative A cannot be determined given the current state of the science and assessment methodology.

To calculate emissions associated with the proposed action, emissions attributable to Scopes 1, 2, and 3 as defined in EO 13514 have been estimated. Scope 1 emissions include those emissions attributable to sources that are owned and operated by the federal government. These emissions would include emissions from stationary sources at the project site.

Scope 2 emissions include those emissions that are direct GHG emissions resulting from the generation of electricity, heat, or steam purchased by a federal agency. Scope 3 emissions include GHG emissions from sources not owned or directly controlled by a federal agency, but related to agency activities such as the construction activities proposed under Alternative A.

Currently, there are no formally adopted or published NEPA thresholds for GHG emissions. On 18 February 2010, the CEQ released draft guidance on addressing climate change in NEPA documents. The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a threshold of 25,000 metric tons of CO<sub>2</sub>e emissions. The CEQ indicates that use of 25,000 metric tons of CO<sub>2</sub>e emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, to provide action-specific evaluation of GHG emissions and disclosure of potential impacts. In the absence of formally-adopted thresholds of significance, this EA compares GHG emissions that would occur from Alternative A with this 25,000 metric ton level.

Table 4.1-1 shows that the annual CO<sub>2</sub>e emissions estimated for the proposed action would be less than the significance threshold of 25,000 metric tons of CO<sub>2</sub>e. Therefore, Alternative A would produce less than significant cumulative impacts to global climate change.

#### 4.1.2 Alternative B: Realigned Alternative

Under Alternative B, site development would be similar to Alternative A, but with a slightly different alignment. Therefore, impacts to air

quality and global climate change would be the same as described for Alternative A.

#### **4.1.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur. Therefore, no impacts to air quality would occur as a result of emissions associated with project activities.

### **4.2 Biological Resources**

Impacts to biological resources would occur if special status species (i.e., endangered, threatened, rare, or candidate) or their habitats, as designated by federal and state agencies, would be directly or indirectly affected by project-related activities. In addition, impacts to biological resources are considered adverse if substantial loss, reduction, degradation, disturbance, or fragmentation would occur to native species or their habitats. Potential effects can be short-term impacts (e.g., noise and dust during construction), or long-term impacts, including the permanent loss of vegetation and, consequently, loss of the capacity of habitats to support wildlife populations.

#### **4.2.1 Alternative A: Proposed Action**

All of the plant communities affected by construction under the proposed action are mixed non-native and native habitats that are well represented in the region. No project related construction or activities would occur in riparian areas, and therefore no direct impacts to riparian plant communities or habitats are expected. As described below, two existing plant communities, including central coast scrub/maritime scrub and coastal bluff /dune scrub, support listed plant and wildlife species. Although natural vegetation communities occurring in the project area would be permanently removed, the small amount of loss of these vegetation types associated with access and removal of poles would not be considered adverse due to

the small amount removed and the abundance of these communities in the project vicinity.

#### **Wildlife Species**

As described above, implementation of the proposed action would result in the permanent loss of plant communities that provide habitat for common wildlife species. However, the small amounts that would be permanently lost would not measurably reduce regional populations of common wildlife species. No natural riparian or wetland habitat would be lost. Consequently, no direct adverse impacts to common terrestrial wildlife would occur.

Temporary, indirect impacts to wildlife species may occur within adjacent wildlife habitat due to an increase in dust, noise, and other construction related disturbances. Temporary disturbances due to noise and human presence could disrupt foraging and roosting activities, or cause common bird and wildlife species to avoid the work area during construction periods. However, common wildlife species in the project area have adapted to some level of ongoing human activity and would continue to use the adjacent areas in the intervals between disturbances. Therefore, temporary, incidental disturbances during construction would not result in adverse indirect impacts to wildlife species.

#### **Special Status Species**

The USFWS issued a Biological Opinion for the proposed action on 4 May 2011. Vandenberg AFB will comply with all terms and conditions stipulated in the Biological Opinion. Potential impacts of the proposed action on federally and state listed species are discussed below. Implementation of the environmental protection measures described in Section 2.5, Environmental Protection Measures, and complying with all the terms and conditions in the Biological Opinion would ensure that impacts on special status species would be minimized.

### **Beach Layia**

Approximately 1.6 miles of existing Feeder Line N6 runs parallel to and within potential beach layia habitat. However, the majority of known locations of this species are located north of the project area (Figure 3.2-1). The new Feeder Line N6 would be installed outside existing, occupied beach layia habitat and immediately adjacent to Surf Road to reduce impacts on this species. However, removal of poles along the existing Feeder Line N6 would result in potential impacts to this species. In areas determined particularly sensitive by Vandenberg AFB botanists, removal of power poles would be conducted by hand or other non-invasive removal methods (e.g., crane or helicopter).

Proposed activities that could damage or remove beach layia include vegetation removal and disturbance (e.g., vehicles driving over plants for access to project site). Approximately 22 poles within suitable habitat for this species would be removed; however none of these poles are located within areas known to be occupied by beach layia. Implementation of the environmental protection measures described in Section 2.5, Environmental Protection Measures, including pre-construction surveys to identify areas where avoidance of beach layia is feasible, mandatory awareness briefings for all workers, the presence of a qualified biological monitor during construction activities within or adjacent to beach layia habitat, implementation of a beach layia seed bank removal and replacement program, and removal of iceplant at a 2:1 ratio to compensate for areas where beach layia is impacted during construction activities, should ensure no adverse impacts to beach layia would occur.

### **California red-legged frog**

California red-legged frogs are known to be present in two areas that could be affected by the proposed action, including Cañada Honda Creek and SLC-6. However, proposed demolition and construction activities would not occur in any water bodies that could

provide habitat for this species. The California red-legged frog has been found up to 400 feet from water in riparian vegetation, and may disperse through upland areas. Therefore, proposed activities that occur outside riparian corridors have the potential to encounter and adversely affect California red-legged frogs. All overhead electrical lines would span riparian corridors and no access road would be constructed within riparian areas. Nevertheless, as described in Section 2.5, Environmental Protection Measures, silt fencing would be installed in areas determined appropriate by 30CES/CEAN biologists to minimize the transport of sediment into waterways. Potential impacts would be limited to construction personnel and equipment transiting through project areas. All personnel would be required to attend a mandatory education program about all listed species in the project area and their habitats. Furthermore, a qualified biologist familiar with California red-legged frog would monitor activities within areas determined sensitive for this species. Adherence to the minimization, monitoring, and enhancement measures included in the Biological Opinion for the Replacement of Three Electrical Distribution Lines on South Vandenberg Air Force Base, Santa Barbara County, California (8-8-11-F-16), including no construction of access roads within riparian corridors; installation of silt fencing, where necessary; minimization of influx of sediment into waterways; and biological monitoring, as described above, would ensure no adverse impacts to California red-legged frogs would occur.

### **El Segundo blue butterfly**

As proposed activities could occur during the flight season, damaging seaciff buckwheat plants could directly or indirectly affect the El Segundo blue butterfly. Proposed activities that would have direct effects on El Segundo blue butterflies include removal and disturbance of seaciff buckwheat (the host plant for El Segundo blue butterfly) and vehicle traffic in proximity to seaciff buckwheat. Removal of mature seaciff buckwheat plants

would eliminate potential habitat for El Segundo blue butterfly within the project area. Soil compaction activities, including vehicular traffic, have the potential to crush diapausing pupae (nonfeeding stage between the larva and adult), resulting in the mortality of individuals. Although the entire project site is considered potential habitat, it is estimated that a maximum of 300 seacliff buckwheat plants would be impacted by the proposed action.

Implementation of the environmental protection measures described in Section 2.5, Environmental Protection Measures, including pre-construction surveys to identify areas where avoidance of seacliff buckwheat plants is feasible and enhancing suitable habitat for El Segundo blue butterfly at a 2:1 ratio in nearby areas when avoidance is not feasible, and adherence to the minimization, monitoring, and enhancement measures included in the Biological Opinion for the Replacement of Three Electrical Distribution Lines on South Vandenberg Air Force Base, Santa Barbara County, California (8-8-11-F-16) would ensure no adverse impacts to this species would occur.

### ***Gaviota tarplant***

Although a large portion of the project area consists of ruderal vegetation within previously disturbed areas, the Gaviota tarplant is known to occur in these types of lower-quality habitats. Proposed activities that could adversely impact Gaviota tarplant include excavation, construction of access roads and staging areas, and vegetation disturbance. However, potential suitable habitat located near SLC-6 and SLC-5 (inactive) would be monitored by a qualified biologist during construction activities adjacent to these areas (refer to Section 2.5, Environmental Protection Measures). Impacts to Gaviota tarplant would be relatively minor because, although some individuals could be removed, there is other higher-quality habitat on Vandenberg AFB and throughout this species range. Therefore, no adverse impacts to Gaviota tarplant would occur.

## **Waters of the U.S. and Wetlands**

Impacts to jurisdictional waters of the U.S. and wetlands are considered significant if the proposed action results in a net loss of wetland area or habitat value, either through direct or indirect impacts to wetland vegetation, loss of habitat for wildlife, degradation of water quality, or alterations in hydrological function.

At this conceptual stage of the project, anticipated impacts to jurisdictional waters of the U.S. and wetlands cannot be determined because final designs would be decided by the construction contractor as part of the design-build contract; however, without avoidance measures, the potential for some small loss or degradation of wetlands is conservatively assumed. Implementation of environmental protection measures described in Section 2.5, Environmental Protection Measures, would include conducting pre-construction surveys to identify areas that may fall within the definition of waters of the U.S. under Section 404 of the Federal Water Pollution Control Act (CWA), including wetlands, and avoiding construction within waters of the U.S. and wetland areas during the wet-season. Because final construction plans would be developed under a design-build contract, minor deviations from the current conceptual site plan may be required during the final design phase. During this process, the design contractor would consult with Vandenberg AFB staff to plan construction that would avoid damage to jurisdictional areas. This avoidance approach would ensure that construction of the proposed action would not place dredge or fill material in waters of the U.S. Therefore, impacts would not be significant.

### **4.2.2 Alternative B: Realigned Alternative**

Under Alternative B, site development would be similar to Alternative A, but with a slightly different alignment. Similar to Alternative A, the proposed realignments would avoid impacts to beach layia habitat by removing approximately 15 poles by crane and

prohibiting ground disturbing activities within beach layia habitat west of Coast Road, south of Bear Creek Road, and north of Honda Creek. Therefore, impacts on biological resources would be the same as described for Alternative A.

#### **4.2.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur; therefore, no impacts to biological resources would occur.

### **4.3 Cultural Resources**

The proposed action is subject to compliance with all relevant authorities governing cultural resources, including Section 106 of the NHPA and Air Force Instruction 32-7065. Compliance with Section 106 of the NHPA also satisfies federal agencies responsibilities for considering potential project related effects to cultural resources under NEPA. Section 106 of the NHPA requires federal agencies to consider the effects of proposed federal undertakings on cultural resources that are listed in or eligible for listing in the NRHP (i.e., historic properties). Part of Section 106 compliance requires the federal agency to determine either that the undertaking would have no effect to historic properties, no adverse effect to historic properties, or an adverse effect to historic properties. The Section 106 implementing regulations (36 CFR Part 800) prescribe the process for making these determinations.

#### **4.3.1 Alternative A: Proposed Action**

Thirty-four archaeological sites are identified within or immediately adjacent to the proposed action. A detailed analysis of the environmental consequences at each archaeological site is included in the SHPO report (Peterson and Ryan 2011). This section summarizes the environmental consequences associated with the proposed action (Table 4.3-1).

Eleven sites do not have the significant characteristics that qualify them as “historic properties” that are eligible for listing in the NRHP. Since these sites do not have significant characteristics, therefore, the proposed action would not have significant consequences to them. Of the remaining 23 sites, 13 have been determined eligible for listing in the NRHP and 10 are assumed to be eligible for listing in the NRHP for purposes of the proposed action. The proposed action has the potential to adversely affect eight of these eligible sites. The proposed action would have no adverse effect to the other 15 historic properties within the APE.

The proposed action includes implementation of environmental protection measures described in Section 2.5, Environmental Protection Measures, including installation of temporary exclusionary fencing, prohibiting vehicular access within NRHP-eligible sites, and adherence to 36 CFR 800.13 (Post review discoveries) and Vandenberg AFB Integrated Cultural Resources Management Plan procedures in the event previously undocumented cultural resources are discovered during construction activities. Adherence to these measures would minimize impacts on most of the NRHP-eligible sites within the project area. However, proposed installation of poles within two site boundaries would adversely affect these NRHP-eligible sites.

#### **4.3.2 Alternative B: Realigned Alternative**

This alternative is the same as Alternative A except that the new feeder line route would be relocated to avoid known cultural resources within the project area. Under this alternative, the new feeder line would be realigned as follows: 1) two new poles located on the southeast corner of the Tow Route west of Sudden Road would be relocated within the Tow Route road berm 120 feet south of the existing power poles; and 2) two poles located east of Coast Road would be relocated east of the paved road. Vandenberg AFB would adopt a strategy of avoidance at these two

Table 4.3-1. Environmental Consequences to Cultural Resources from the Proposed Action

Site CA-SBA-	NRHP Eligibility	Environmental Consequences
0537	Eligible	Three new poles would be installed and four existing poles would be removed within CA-SBA-0537. Four loci within the site contain its significant qualities. Only one of the new poles is within a locus. However, testing at that locus found only extremely low densities of archaeological materials (Environmental Solutions 1990d; Moore et al. 1988) and the significant data potentials have been realized. Consequently, pole installation would not adversely affect the site's significant qualities (Peterson and Ryan 2011). Three poles to be removed are within Locus B; the fourth pole is outside any locus and can be removed without affecting the site's significant qualities. To avoid Locus B impacts while removing the remaining three poles, Vandenberg AFB would prohibit vehicle traffic by installing temporary exclusionary fencing across the power line corridor. Each of the three remaining poles in Locus B can be removed by a crane parked on paved roads, thus avoiding adverse affects to the site's significant qualities.
0538	Ineligible	No environmental consequences to CA-SBA-0538 because it is not eligible for the NRHP.
0551	Eligible	Three new poles would be installed at the eastern edge of the site, along Lunar Avenue. Previous testing in this area determined that construction of Lunar Avenue had removed the site deposit (Lebow et al. 2003), including the area where the new poles would be installed. Consequently, installation of the three poles would not adversely affect the site's significant qualities.
0636	Unevaluated	CA-SBA-0636 is assumed eligible for the NRHP for the proposed action. Two new poles would be installed adjacent to a paved road. Both poles are outside the site boundary, although the line itself intersects the edge of the site. Both new poles would be installed by a truck parked on the paved road, and the poles themselves would be installed in fill. Consequently, the site would not be adversely affected.
0639	Unevaluated	CA-SBA-0639 is assumed eligible for the NRHP for the proposed action. Seven existing poles from an abandoned line would be removed; one of the poles has already fallen down. No replacement line is proposed. Enright and Lebow's (2011) study for the proposed action found that the northernmost four of the existing poles are in dense shell midden. Testing at the southernmost three poles found few archaeological materials and Vandenberg AFB would allow removal of those three poles using vehicles. Vehicle traffic would be prohibited for the four northernmost poles, and temporary exclusionary fence would be installed immediately north of the third pole to enforce the traffic prohibition. The four northernmost poles would be abandoned in place, or would be cut off at the base and left on the ground. Removing the poles by helicopter or by bucking them into pieces and manually transporting them would be allowed.
0643/H	Unevaluated	CA-SBA-0643/H is assumed eligible for the NRHP for the proposed action. A single new pole would be installed within the site and five existing poles would be removed. Seven shovel test pits were excavated for the proposed action (Enright and Lebow 2011). Six of the units were sterile and one found very little. Given the near lack of archaeological materials, Vandenberg AFB has determined that the proposed action would not adversely affect the site.
0647	Eligible	A single pole from an existing line would be removed from the site. This pole is at the eastern site boundary. Previous testing near the pole found only a low-density deposit (Doyle et al. 1996) and removal of the pole would not adversely affect the site's significant qualities.
0654	Eligible	Two poles would be installed in an intact portion of the site. Therefore, the proposed action under Alternative A would have the potential to adversely affect the site's significant qualities.
0662	Eligible	Four existing poles would be removed from the site, but no new poles are planned. Subsurface testing at the northernmost two poles to be removed found no archaeological materials and thus their removal would not adversely affect the site. The southernmost two poles are within well developed shell midden (Enright and Lebow 2011). Vandenberg AFB would avoid impacting this portion of the site by prohibiting vehicle traffic and using one of two strategies: abandoning the poles in place or cutting the poles off at the base and leaving them on the ground. A variation of the second strategy is to cut the poles off at the base and use a helicopter to carry the poles away, or cutting up the poles into sections that can be manually carried away.
0670	Eligible	Five poles would be installed in CA-SBA-670 and five poles would be removed. All of these are in the eastern portion of the site, well outside the site's well developed midden. Testing at each new pole location for the proposed action failed to find any archaeological remains (Enright and Lebow 2011). All five of the existing poles can be removed by a truck parked on a paved road. Consequently, the proposed action would not adversely affect the site's significant qualities.
0676/H	Eligible	Two new poles would be installed, one just north of the site in a graded borrow area, and one just south of the site. Both of these poles would be set from a paved road. Temporary exclusionary fencing would be installed to ensure that pole installation activities remain outside the site boundary.
1106	Ineligible	No environmental consequences to CA-SBA-1106 because it is not eligible for the NRHP.
1107	Ineligible	No environmental consequences to CA-SBA-1107 because it is not eligible for the NRHP.



Table 4.3-1. Environmental Consequences to Cultural Resources from the Proposed Action (continued)

Site CA-SBA-	NRHP Eligibility	Environmental Consequences
1114	Ineligible	No environmental consequences to CA-SBA-1114 because it is not eligible for the NRHP.
1119	Eligible	CA-SBA-1119 lies in the bottom of a canyon and is spanned by the existing and replacement feeder lines. No existing poles are within the site and no new poles would be within the site. Consequently, the site would not be adversely affected by the proposed action.
1122/H	Ineligible	No environmental consequences to CA-SBA-1122/H because it is not eligible for the NRHP.
1124H	Ineligible	No environmental consequences to CA-SBA-1124/H because it is not eligible for the NRHP.
1145/H	Eligible	One existing pole would be removed from CA-SBA-1145/H. An inspection of the pole location for the proposed action found no archaeological materials (Peterson and Ryan 2011). To avoid impacting the site, the pole would be felled toward an existing paved road, where it can be removed by a crane or boom truck parked on the road.
1149/H	Unevaluated	CA-SBA-1149/H is assumed eligible for the NRHP for the proposed action. Nine new poles would be installed and nine existing poles removed as part of the proposed action. All nine new poles would be installed at the edge of a paved road that cuts deeply through the site. All would be well below the depth of the archaeological deposit and thus would have no adverse effect. The nine existing poles are on top of the deep cut. To avoid impacting the site, each of these nine poles would be cut off at the base and removed by a boom truck or crane parked on the road.
1542	Eligible	Five existing poles would be removed from within CA-SBA-1547, and four new poles would be installed. Testing for the proposed action (Enright and Lebow 2011) as well as excavations for other projects (Harro and Gerber 1999; Rudolph 1984) defined the area containing the site's significant deposit. None of the five existing poles are in the significant deposit. However, installation of two new poles would potentially have adverse effects on this site. Although temporary exclusionary fencing would be installed to ensure that vehicles do not cross the significant portion of the site, the proposed action under Alternative A would have the potential to adversely affect the site's significant qualities.
1544	Eligible	One existing pole would be removed from CA-SBA-1544. Testing at the site in 1980 (Glassow and Kronfeld 1981) in the vicinity of the existing pole did not find any archaeological materials. Consequently, removing the existing pole would not adversely affect the site.
1547	Eligible	One new pole would be installed at the eastern edge of CA-SBA-1547. However, it would be installed in road fill that is about 45 feet (15 meters) deep and thus would not impact the site.
1559	Unevaluated	CA-SBA-1559 is assumed eligible for the NRHP for the proposed action. A single new pole would be installed at the site, but would be placed in deep road fill that caps the site and thus the site would not be impacted.
1560	Unevaluated	CA-SBA-1560 is assumed eligible for the NRHP for the proposed action. A single new pole would be installed and an existing pole would be removed. The existing pole is in deep road fill, and the new pole would be placed in deep road fill. Neither action would affect the site buried beneath the fill.
1561	Unevaluated	CA-SBA-1561 is assumed eligible for the NRHP for the proposed action. A single new pole would be installed at the site, but would be placed in deep road fill that caps the site and thus the site would not be impacted.
1678	Ineligible	No environmental consequences to CA-SBA-1678 because it is not eligible for the NRHP.
1686	Unevaluated	This site was destroyed by construction of a facility. No existing or new poles are within the site. Consequently, this site would not be adversely affected.
1940	Ineligible	No environmental consequences to CA-SBA-1940 because it is not eligible for the NRHP.
2219	Ineligible	No environmental consequences to CA-SBA-2219 because it is not eligible for the NRHP.
2222	Unevaluated	CA-SBA-2222 is assumed eligible for the NRHP for the proposed action. No new poles and no replacement poles are within the site. The entire site is capped by road fill and thus would not be affected by the proposed action.
2230	Ineligible	No environmental consequences to CA-SBA-2230 because it is not eligible for the NRHP.
2231/H	Ineligible	No environmental consequences to CA-SBA-2231/H because it is not eligible for the NRHP.
2920H	Unevaluated	CA-SBA-2920H is assumed eligible for the NRHP for the proposed action. Four existing poles would be removed. All four are along a paved road. To avoid impacting the site, each pole would be cut off at the base and removed by equipment parked on the road.
3547H	Eligible	CA-SBA-3547H is a complex of buildings, including the existing electrical system. An existing pole and feeder line would be replaced in-kind. Consequently, the site's significant qualities would not be adversely affected.

sites by imposing conditions upon the installation of poles within NRHP-eligible site boundaries and by modifying the alignment of the new feeder lines. Realigning the new feeder line route would reduce impacts on cultural resources compared to Alternative A.

Alternative B includes implementation of environmental protection measures described in Section 2.5, Environmental Protection Measures, including installation of temporary exclusionary fencing, prohibiting vehicular access within NRHP-eligible sites, and adherence to 36 CFR 800.13 (Post review discoveries) and Vandenberg AFB Integrated Cultural Resources Management Plan procedures in the event previously undocumented cultural resources are discovered during construction activities. Adherence to these measures should ensure none of the 23 sites eligible for, or assumed to be eligible for, listing in the NRHP would be adversely affected by Alternative B. Accordingly, Vandenberg AFB concluded that the Section 106 finding for Alternative B was no historic properties affected. The SHPO concurred with Vandenberg AFB's findings on 20 June 2011 (OHP file reference # USAF110418A).

#### **4.3.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur. Therefore, no impacts on cultural resources would occur.

### **4.4 Geology and Earth Resources**

Factors considered in determining whether an alternative would have adverse impacts on geology and earth resources include the extent or degree to which implementation of an alternative would:

- Result in substantial soil erosion or the loss of topsoil; or

- Expose people or structures to potential substantial adverse effects, involving rupture of a known earthquake fault, strong seismic ground shaking, and/or liquefaction.

#### **4.4.1 Alternative A: Proposed Action**

##### **Soils and Erosion**

Site development would result in removal of vegetation and associated soil disturbance; thus, temporarily exacerbating the potential for erosion-induced sedimentation of the surface drainages (i.e., Grey Canyon, Red Roof Canyon, Oil Well Canyon, and three unnamed drainages) that traverse the site and Cañada Honda Creek.

The proposed action qualifies as a Linear Underground/Overhead Project, which is not defined as a construction activity because it is a replacement of existing electrical lines. Furthermore, the proposed action meets SWRCB's definition of routine maintenance because it is an update to an existing line to comply with applicable codes, standards, and regulations. Therefore, demolition/construction would not be required to meet SWRCB requirements for a NPDES Construction General Permit. However, the construction contractor would prepare an erosion control plan before project implementation, which would require implementation of standard erosion control measures. In addition, the contractor would implement BMPs before and during project construction to minimize soil erosion (refer to Section 2.5, Environmental Protection Measures). Rehabilitating (i.e., paving) old access roads and constructing new access roads would result in an increase in impermeable surfaces, thus increasing potential runoff from the project site. However, as discussed in Section 2.5, Environmental Protection Measures, proposed drainage features would prevent concentrated runoff, thus reducing the potential for erosion. The drainage features would be reviewed by the 30 CES Construction Stormwater Manager and would be designed to reduce offsite runoff velocities to levels less than or equal to existing conditions. The final design of the

drainage facilities would be determined during the design phase of the project. In addition, vegetation removal would be minimized to the extent feasible and avoided in surface water drainages.

Due to implementation of an erosion control plan, BMPs, and incorporation of drainage features into project design, adverse impacts on geology and earth resources should not occur.

### **Seismicity**

The project site is not underlain by any mapped active faults and the project does not include development of any new structures beyond roads and new power poles. Although active faults located within the region could result in strong seismically induced ground shaking, the potential for surface fault rupture and liquefaction on Vandenberg AFB would be minimal. Therefore, adverse impacts associated with seismically induced ground shaking should not occur.

#### **4.4.2 Alternative B: Realigned Alternative**

Buildout of Alternative B would have a similar configuration (i.e., same amount of potential ground disturbance and impervious surfaces) as Alternative A. Therefore, impacts would be the same as those described for Alternative A.

#### **4.4.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur; therefore, no impacts on geology and earth resources would occur.

### **4.5 Land Use and Coastal Zone Resources**

Factors considered in determining whether an alternative would have adverse impacts on land use and coastal zone resources include

the extent or degree to which implementation of an alternative would:

- Result in land uses on the project site that are incompatible with, or would have a substantial adverse impact on, the existing character of adjacent land uses; or
- Conflict with substantive requirements of land use plans or policies.

#### **4.5.1 Alternative A: Proposed Action**

##### **Land Use**

As stated in Section 3.5, Land Use and Coastal Zone Resources, the project site is predominately undeveloped/open space with the exception of launch operation support facilities associated with SLC-4 and SLC-6 and utility infrastructure. The proposed action would repair and replace the overhead electrical line, Feeders N1, N3, and N6 on south Vandenberg AFB. This alternative would be compatible with the existing facilities in the project area, and land use would be the same as existing uses onsite. Therefore, no adverse impacts on land use would occur.

##### **Coastal Zone Management**

The proposed action would be subject to a federal Coastal Zone Consistency Review for compliance with the CZMA. The Air Force has analyzed the effects of the proposed action by evaluating reasonable foreseeable direct and indirect effects on coastal uses and resources and has determined there would be no effects to coastal uses or resources. The proposed action would be consistent with the existing land uses in the project area and would not substantially differ from existing military and industrial activities in the project vicinity. Notification of this determination was filed with the CCC on 9 May 2011.

#### **4.5.2 Alternative B: Realigned Alternative**

Under Alternative B, site development would be similar to Alternative A, but with a slightly different alignment. Impacts associated with land use compatibility and coastal resources

would be the same as described for Alternative A.

#### 4.5.3 Alternative C: No-Action Alternative

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur. Therefore, no impacts on land use and coastal zone resources would occur.

### 4.6 Noise

Noise impacts are based on estimates of the audible increment of noise above a background level. In general, ambient noise levels depend on noise generating activities occurring within a relatively limited geographic area. To the extent those activities do not change substantially over time, the ambient noise in the area would remain relatively constant as would the noise baseline.

Pursuant to federal OSHA regulations, employees should not be subject to noise levels exceeding 90 dB  $L_{eq[h]}$  for an 8-hour period. Noise levels exceeding 115 dBA are permitted for a maximum of 15 minutes within an 8-hour period. Noise exposure above 115 dBA is not permitted. For this analysis, noise impacts would be considered substantial if they exceeded OSHA standards. As the

project site is a restricted area for military/authorized personnel, there are no adjacent sensitive receptors that would be affected by the proposed action. Therefore, noise impacts would be limited to onsite military and construction personnel.

#### 4.6.1 Alternative A: Proposed Action

Construction activities associated with the proposed action would involve demolition of existing electrical lines, and construction of new overhead electrical lines and access roads. The activities would use standard equipment including trucks, earthmovers (e.g., dozers, scrapers, loaders, excavators), and compressors, over an approximate 14-month period. Typical noise levels of construction equipment are presented in Table 4.6-1. As such, increases in noise associated with the construction activities would be temporary; no long-term construction noise impacts would occur.

The proposed action would temporarily increase ambient noise levels in the project vicinity. Hourly average  $L_{eq}$  noise levels were estimated for the proposed action based on the types and numbers of equipment anticipated to be onsite during construction. During demolition and construction activities, overall noise levels would result from the combined effect of the noise contributions

Table 4.6-1. Estimated Construction/Demolition Equipment Noise Levels

<i>Equipment</i>	<i>Estimated Noise Level (dBA) at 50-ft</i>
Air compressor	80
Backhoe	80
Compactor (ground)	80
Concrete Mixer Truck	85
Crane, mobile or stationary	85
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator (more than 25 KVA)	82
Grader	85
Jack Hammer	85
Paver	85
Pump	77
Rock Drill	85
Scraper	85
Sources: FHWA 2006. National Cooperative Highway Research Program (1999).	

from multiple pieces of equipment in use at a given time. Construction equipment would generate relatively continuous noise ranging from 77 to 85 dBA at 50 feet from the source (Table 4.6-1).

Estimated noise levels due to proposed construction activities would not result in a substantial increase in noise exceeding OSHA regulations, since noise levels would remain below 90 dB  $L_{eq[h]}$ . Therefore, no adverse impacts on noise would occur.

Proposed annual maintenance activities would be typical of industrial land uses and would not substantially differ from the existing noise environment within the project vicinity. Therefore, annual maintenance activities would not result in a significant increase in noise levels over what currently exists in the project vicinity. Therefore, no adverse impacts on noise would occur.

#### **4.6.2 Alternative B: Realigned Alternative**

Potential sound levels produced during demolition, construction, and annual maintenance activities would be identical to Alternative A. Under Alternative B, impacts on noise would be the same as those described for Alternative A.

#### **4.6.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur; therefore, no impacts on noise would occur.

### **4.7 Public Health and Safety**

Potential impacts associated with public health and safety are evaluated using federal, state, and local regulatory requirements, contract specifications, and Base operating constraints, as outlined in Section 3.7, Public Health and Safety. Hazardous materials management requirements are stipulated in federal and state EPA and OSHA regulations, contract specifications, and the Vandenberg

AFB Hazardous Material Management Plan (30 SWP 32-7086).

Non-compliance with applicable regulatory requirements, human exposure to hazardous materials and wastes, or environmental release above permitted limits, would be considered adverse impacts.

#### **4.7.1 Alternative A: Proposed Action**

##### **Hazardous Materials and Waste**

Compliance with all applicable federal, state and local rules and regulations would govern all activities associated with the proposed action, which would minimize the potential for adverse effects. Specifically, hazardous materials and waste would be regulated by the procedures outlined in the Vandenberg AFB *Hazardous Materials Management Plan*, 30 SWP 32-7086, and Vandenberg AFB *Hazardous Waste Management Plan*, 30 SWP 32-7043A.

Proposed construction activities would require the use of hazardous materials similar to those currently used and managed on Vandenberg AFB. However, only a small number of equipment would be operating at any one time and there would not be a significant increase in the amounts of hazardous materials present on Base. Demolition activities, including removal and disposal of existing creosote-treated wood poles and transformers containing PCBs, would be disposed of in compliance with federal and state EPA and OSHA regulations, the Vandenberg AFB Hazardous Material Management Plan (30 SWP 32-7086), and applicable hazardous waste regulations. Therefore, impacts to hazardous materials and waste management would not be adverse and be insignificant.

Potential adverse effects could result from accidental releases of POLs from vehicle and equipment leaks. All hazardous wastes would be properly managed and disposed of in accordance with applicable federal, state, and local hazardous waste regulations, including the Vandenberg AFB *Hazardous Waste Management Plan* (30 SWP 32-

7043A). All hazardous wastes would be managed during release response and clean-up, and no adverse impacts would occur.

### Installation Restoration Sites

As described in Section 3.7.3, there are eight open hazardous release sites, including two IRP sites, two AOCs, and four AOIs, located within the project area. As various contaminants could be present at these sites, there is a potential that contaminants would be encountered during ground disturbing activities. Consequently, the proposed action could alter the risks of exposure to soil or groundwater contaminants associated with these hazardous release sites. However, in the event contamination is discovered during construction activities, the 30 CES/CEA Environmental Restoration Office would be contacted immediately for necessary remedial requirements. In addition, the proposed action would comply with all federal regulations governing IRP activities, including the procedures stipulated in the Federal Facilities Site Remediation Agreement. As the proposed action would comply with federal regulations that would minimize human exposure to contaminants, no adverse impacts on public health and safety would occur. Therefore, there would be no significant impacts.

### Unexploded Ordnance

Since ordnance can be found in several areas on Base, all ground disturbing activities would be coordinated with the 30 SW/SEW. In the event UXO was discovered on the project site, it would not be disturbed. All UXO would be removed by authorized personnel. Therefore, no adverse impacts on public health and safety should occur.

### Federal Health and Safety Requirements

All applicable OSHA requirements and Air Force regulations would be specified in construction contracts and implemented with standard BMPs associated with the proposed action. As discussed in Section 2.5, Environmental Protection Measures, a health

and safety plan would be implemented and a formally trained individual would be the safety officer and the main point of contact for all job site safety issues. Impacts from potential health risks to construction personnel and the public would not be significant because work would be done by an experienced, licensed contractor and the work would follow an approved health and safety plan. Therefore, adverse impacts associated with environmental health risks should not occur.

Biological hazards, including vegetation (i.e., poison oak and stinging nettle), animals (i.e., insects, spiders, and snakes), disease vectors (i.e., ticks and rodents), and physical hazards (i.e., holes and ditches, uneven terrain, sharp or protruding objects, unstable ground) exist within the project area, and have the potential to adversely impact the health and safety of construction and/or maintenance personnel. Adherence to federal OSHA regulations would minimize the exposure of workers to these hazards. In addition, awareness training would be incorporated into health and safety protocol (refer to Section 2.5, Environmental Protection Measures).

The proposed action would include annual maintenance activities along the new overhead electrical line corridor. As there would be no consequential change in the level of maintenance activities compared to existing conditions, adverse impacts on public health and safety should not occur.

### 4.7.2 Alternative B: Realigned Alternative

Alternative B site preparation would be similar to Alternative A, but with a slightly different alignment, and would result in the same level of potential human exposure to hazardous materials and waste, UXO, and physical and biological hazards. Therefore, impacts to public health and safety would be the same as described for Alternative A.

### 4.7.3 Alternative C: No-Action Alternative

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur; therefore, no impacts on public health and safety would occur.

## 4.8 Transportation

Factors considered in determining whether an alternative would have adverse impacts on transportation include the extent or degree to which implementation of an alternative would:

- Result in a primary roadway no longer being able to service existing traffic demands; or
- Result in traffic to shift to a roadway that was incompatible with those traffic increases (e.g., inadequate pavement structure or design capacity), or could cause potential safety problems.

### 4.8.1 Alternative A: Proposed Action

Implementation of the proposed action would temporarily affect the local roadway network through the delivery of materials during site construction. However, since increases in traffic volumes associated with construction activities would be temporary, no long-term impacts to the regional transportation network would occur.

Heavy construction vehicles would be kept onsite for the duration of their use. Thus, increases in traffic volumes would mainly result from construction workers traveling to and from the project site and trucks delivering materials to and removing material from the project site.

Traffic impacts during construction are anticipated to be minimal. Anticipated traffic volumes during construction would be within the capacity of surrounding roadways, including Arguello Road, Surf Road, Coast Road, Honda Ridge Road, Lunar Avenue, Plato Road, Six Road, Kelp Road, Tank

Road, Delphy Road, Road N, and Point Road. Existing levels of service along these roadways are adequate to accommodate proposed traffic increases during construction. Therefore, no adverse impacts to traffic would occur. Therefore, there would be no significant impacts.

Proposed annual maintenance activities would not substantially increase overall traffic volumes or circulation patterns within the Base. As there would be no consequential change in the level of operational activities associated with the proposed action, annual maintenance activities would not substantially increase traffic accessing Vandenberg AFB or the project site over existing conditions.

### 4.8.2 Alternative B: Realigned Alternative

Alternative B transportation impacts during construction would be similar to Alternative A because the amount of heavy equipment and grading would be relatively the same. Traffic impacts from Alternative B annual maintenance activities would be the same as described for Alternative A.

### 4.8.3 Alternative C: No-Action Alternative

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur. Therefore, no impacts on transportation would occur.

## 4.9 Visual Resources

Factors considered in determining whether an alternative would have adverse impacts on visual resources include the extent or degree to which implementation of an alternative would:

- Substantially degrade the existing visual character or quality of the site and its surroundings; and/or
- Create a new source of substantial light or glare that would adversely



affect day or night views in the area or that would substantially impact other people or properties.

#### 4.9.1 Alternative A: Proposed Action

The proposed action would include demolition of existing electrical lines, construction and annual maintenance of new overhead electrical lines (Feeder Lines N1, N3, and N6), and construction of new access roads.

Proposed construction activities would require the use of excavators, loaders, conveyers, and support equipment over a 14-month period. Construction activities would be visible to individuals traveling on surrounding roadways (e.g., Coast Road, Surf Road, Honda Ridge Road, and Lunar Road). However, the presence of construction equipment would be visually compatible with existing military activity in the project vicinity. In addition, construction equipment would be short-term (approximately 14 months) and occur in an area that is accessible only to military and authorized personnel. Furthermore, the majority of old access roads would be rehabilitated and/or revegetated subsequent to construction (Section 2.2, Alternative A: Proposed Action). As views of important visual resources would not be substantially altered and the proposed action would be visually consistent with current military activities in the project area, adverse impacts on visual resources would not occur.

The new overhead electrical line would not generate additional daytime onsite glare or sources of nighttime glare. Therefore, adverse impacts resulting from glare would not occur.

As there would be no consequential change in the level of operational activities associated with proposed annual maintenance activities, adverse impacts on visual resources would not occur. Therefore, there would be no significant impacts.

#### 4.9.2 Alternative B: Realigned Alternative

Under Alternative B, site development and the associated construction period (14 months) would be the same as Alternative A.

Therefore, impacts to visual resources would be the same as those described for Alternative A.

#### 4.9.3 Alternative C: No-Action Alternative

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur. Therefore, no impacts on visual resources would occur.

### 4.10 Water Resources

Adverse impacts to water resources would occur if the proposed action caused substantial flooding or erosion; reduced surface water quality to creeks, rivers, streams, lakes, or the ocean; or reduced surface or groundwater quality or quantity.

#### 4.10.1 Alternative A: Proposed Action

The proposed action would not create any structures that would affect the volumes or patterns of surface flows or increase potentials for flooding within the drainage areas flowing into the surface drainages (i.e., Grey Canyon, Red Roof Canyon, Oil Well Canyon, and three unnamed drainages) that traverse the site or Cañada Honda Creek. However, construction of new access roads would increase the potential for long-term erosion on the project site. Grading and construction activities associated with the proposed action would result in temporary soil disturbance, thus increasing the potential for short-term erosion within the immediate drainage area. In addition, the proposed action would potentially discharge construction- and operation-related waste materials that could affect the quality of surface water downstream from the project site.

The proposed action would not require coverage under a NPDES Construction General Permit because it qualifies as a Linear Underground/Overhead Project, which is not defined as construction activity because it is a replacement of existing electrical lines. Furthermore, the proposed action meets SWRCB's definition of routine maintenance because it is an update to an existing line to comply with applicable codes, standards, and regulations. However, as stated in Section 2.5, Environmental Protection Measures, the construction contractor would prepare an erosion control plan before project implementation, which would require implementation of standard erosion control measures that would prevent or minimize dispersion of soils to surface waters. The construction contractor would dispose of all contaminated materials at the appropriate disposal facility. In addition, the contractor would implement BMPs before and during project construction to minimize dispersion of soils to adjacent surface water bodies (refer to Section 2.5, Environmental Protection Measures).

Implementing measures described in Section 2.5, Environmental Protection Measures, should preclude direct impacts to potential waters of the U.S. or wetlands. These measures include pre-construction surveys to identify waters of the U.S. under Section 404 of the CWA and avoiding construction within waters of the U.S. and wetland areas during the wet-season. Because final construction plans would be developed under a design-build contract, minor deviations from the current conceptual site plan may be required during the final design phase. During this process, the design contractor would consult with Vandenberg AFB staff to plan construction that would avoid damage to jurisdictional areas. This avoidance approach would ensure that construction of the proposed action would not place dredge or fill material in waters of the U.S. (refer to Section 2.5, Environmental Protection Measures). Accordingly, a CWA Section 401 Water Quality Certification from the Central Coast RWQCB and CWA Section 404 Permit from

the USACE would not be required for the proposed action because no direct impacts to water bodies or wetlands would occur.

### **Erosion**

Increased erosion potential during construction could result from demolition of the existing electrical line and poles, grading (cut and fill operations), removal of vegetation, soil compaction by heavy equipment, and offsite transport of soils in vehicle tires. Construction of new access roads would increase the potential for long-term erosion on the project site. As discussed in Section 2.5, Environmental Protection Measures, the proposed action would include implementation of an erosion control plan and BMPs to prevent or minimize potential effects to water quality and increased sedimentation in potential waters of the U.S., including nearby surface drainages (i.e., Grey Canyon, Red Roof Canyon, Oil Well Canyon, and three unnamed drainages) and Cañada Honda Creek. In addition, access roads would be constructed outside drainage depressions and construction within these areas would not occur within the wet season (i.e., when soils are wet or there is standing water) (refer to Section 2.5, Environmental Protection Measures). Vegetation removal would be minimized to the extent feasible and avoided in surface water drainages. All heavy equipment would be prohibited in surface water drainages. Furthermore, the majority of old access roads would be rehabilitated and/or revegetated subsequent to construction, thus reducing the need for long-term erosion control measures. Therefore, erosion-related, water quality impacts of nearby surface drainages would not be adverse with implementation of these project design components and BMPs. Thus, there would be no significant impacts. Refer to Section 4.4, Geology and Earth Resources, for additional information pertaining to erosion.

### **Water Quality**

Surface water quality impacts, although unlikely, could potentially occur as a result of inadvertent dispersion of contaminants during

demolition, construction, and subsequent maintenance. No project activities would occur within or nearby any water body and the amount of material potential would be minimal (such as an oil leak from a vehicle); therefore, any accidental spills would remain localized and small. Nonetheless, demolition and construction activities would require the use of vehicles and equipment powered by diesel fuel/gasoline and lubricated with oil and other mechanical fluids, which are considered hazardous substances. Accidental releases of such substances (e.g., spills arising from leakage of fuel, motor oil, or hydraulic fluid during operation and/or equipment maintenance) also could occur. All hazardous wastes would be properly managed and disposed of in accordance with applicable federal, state, and local hazardous waste regulations, including the Vandenberg AFB Hazardous Waste Management Plan (30 SWP 32-7043A). The contractor would follow a spill prevention and response plan, have spill kits, and clean-up spills immediately. Any resulting hazardous waste would be properly disposed of in accordance with Vandenberg AFB procedures. Therefore, no adverse impacts on water quality would occur.

### **Flooding**

Because portions of the site (i.e., access roads) would be paved, surface runoff would potentially increase as a result of the proposed action. However, as part of this alternative, a drainage system would be constructed along the access roads. Therefore, the proposed action would not cause adverse flooding impacts to the surface drainages (i.e., Grey Canyon, Red Roof Canyon, Oil Well Canyon, and three unnamed drainages) that traverse the site or Cañada Honda Creek.

Through implementation of an erosion control plan, BMPs, and incorporation of drainage features into project design, the proposed action would not result in adverse impacts to water resources during demolition, construction, and/or maintenance activities.

### **4.10.2 Alternative B: Realigned Alternative**

Alternative B site preparation would be similar to Alternative A, resulting in the same level of temporary soil disturbance and potential for short-term erosion within the surface drainages (i.e., Grey Canyon, Red Roof Canyon, Oil Well Canyon, and three unnamed drainages) that traverse the site and Cañada Honda Creek. Demolition, construction, and annual maintenance activities would result in similar water quality impacts associated with the potential discharge of construction- and operation-related waste materials. Therefore, impacts to water resources would be the same as described for Alternative A.

### **4.10.3 Alternative C: No-Action Alternative**

Under the No-Action Alternative, repairing and replacing the overhead electrical lines on south Vandenberg AFB would not occur; therefore, no impacts on water resources would occur.

## **4.11 Cumulative Impacts**

CEQ regulations implementing NEPA require that the cumulative impacts of a proposed action be assessed (40 CFR Parts 1500-1508). A cumulative impact is defined as the following:

*“the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR § 1508.7)*

CEQ’s guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine

whether the total effect is significant” (CEQ 1997). The first step in assessing cumulative effects, therefore, involves identifying and defining the scope of other actions and their interrelationship with the proposed action or alternatives. The scope must consider other projects that coincide with the location and timing of the proposed action and other actions, and the duration of potential effects on the environment.

#### 4.11.1 Projects Considered in the Cumulative Analysis

For the purposes of this EA, the project vicinity is defined as the area over which effects of the proposed action could contribute to cumulative effects. The effect of the proposed action on specific resources has been evaluated to include the addition of present and future effects added to those that have occurred in the past. Such cumulative effects have also been added to effects (past, present, and future) caused by all other actions that affect the same resource.

A list of existing or reasonably foreseeable projects that would be constructed in the project region is provided in Table 4.11-1.

#### 4.11.2 Cumulative Impact Analysis

##### Air Quality

Air quality impacts were considered in conjunction with on-going and future projects planned at Vandenberg AFB. The cumulative emissions from Alternative A (proposed action) or Alternative B, in combination with past, present, and future projects, would not exceed the significance thresholds in Santa

Barbara County. Since any project that would cause an exceedance of an ambient air quality standard would be postponed until the following calendar year, Alternative A or Alternative B would not produce any significant cumulative air quality impacts. Thus, there would be no significant impacts.

##### Biological Resources

Present and reasonably foreseeable projects at Vandenberg AFB (e.g., San Antonio Creek restoration project, borrow pits expansion and reactivation project, and demolition and abandonment of Atlas and Titan facilities) involving ground disturbing activities such as grading, paving, landscaping, construction of roads and buildings, and related noise and traffic impacts could result in temporary and localized effects to biological resources that would be individually comparable to those associated with Alternative A (proposed action) or Alternative B. Similar to these alternatives, implementation of environmental protection measures in project designs would minimize adverse impacts on biological resources. As a result, Alternative A or Alternative B, combined with other past and planned activities, would not result in adverse cumulative impacts on biological resources.

##### Cultural Resources

Present and reasonably foreseeable projects on Vandenberg AFB (e.g., borrow pits expansion and reactivation project, San Antonio Creek restoration project, and the overhead electrical line, Feeder Line K project) involving ground disturbing activities within intact, native soils (i.e., not artificial fill areas) and/ modification and/or demolition of

Table 4.11-1. Related and Cumulative Projects

<i>Project Title</i>	<i>Project Status</i>
Demolition and abandonment of Atlas and Titan facilities	Approved project; construction underway.
Combat Information Transport System Upgrade	Approved project; construction underway.
San Antonio Creek Restoration	Approved project; construction underway.
Oak Ridge Tracking Facility Upgrades	Approved project; construction underway.
Entry Control Facilities Security Upgrades	Approved project; construction underway.
California Space Center	Approved project.
Reactivation of SLC-4E	Approved project.
Honda Ridge Equipment Upgrades	Approved project.
Borrow Pits Expansion and Reactivation Project	Approved project.
Repairs and Replacement of Overhead Electrical Line, Feeders K1 and K7	EA being prepared; anticipated construction in 2012.

structures over 50 years of age could result in impacts on cultural resources. Archaeological sites are a limited resource and, therefore, any impact on an archaeological site that qualifies as a historic property may contribute to a cumulative impact. Cumulative construction activities that would potentially disturb unknown, intact subsurface prehistoric or historic archaeological resources would be subject to federal, state, and local regulations that would ensure the preservation and/or recordation of significant cultural resources. Alternative A and Alternative B would include implementation of environmental protection measures described in Section 2.5, Environmental Protection Measures, including installation of temporary exclusionary fencing, prohibiting vehicular access within known cultural sites, and adherence to 36 CFR 800.13 and Vandenberg AFB Integrated Cultural Resources Management Plan procedures in the event previously undocumented cultural resources are discovered during construction activities.

Realigning the new feeder line route would reduce impacts on cultural resources compared to Alternative A. Relocating the new feeder line route to avoid two NRHP-eligible sites within the project area would ensure the contribution of Alternative B to potentially cumulative impacts on cultural resources would not be adverse. As a result, Alternative B combined with other cumulative projects, would not result in adverse cumulative impacts on cultural resources.

### **Geology and Earth Resources**

Cumulative projects at Vandenberg involving grading, excavations, and construction/demolition (e.g., overhead electrical line, Feeder Line K project, Honda Ridge equipment upgrades project, and combat information transport system upgrades) could result in erosion-induced sedimentation of adjacent drainages and water bodies. Alternative A (proposed action) or Alternative B would include construction activities that would temporarily exacerbate the potential for erosion-induced sedimentation of surface drainages (i.e., Grey Canyon, Red Roof

Canyon, Oil Well Canyon, and three unnamed drainages) that traverse the site and Cañada Honda Creek. Construction at cumulative project sites involving grading and construction, in combination with construction for Alternative A or Alternative B, would not result in significant cumulative erosional impacts, due to implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design.

All projects located on Vandenberg AFB are subject to seismically induced ground shaking due to an earthquake on a local or regional fault. Seismic-related impacts at the project site, in combination with probable future projects, would not be cumulatively significant with incorporation of modern construction engineering and safety standards.

### **Land Use and Coastal Zone Resources**

Implementation of Alternative A (proposed action) or Alternative B would not introduce incompatible land uses and would be consistent with guidelines for preservation of natural resources within the coastal zone stipulated in the CZMA. Similarly, construction or operation of related and cumulative projects would be modified during the project review process to ensure compatibility with existing land uses and consistency with provisions stipulated in the applicable federal, state, and/or local land use management plans. Implementation of Alternative A or Alternative B, in conjunction with development of reasonably foreseeable projects, would not result in any adverse cumulative impacts to land use and coastal zone resources.

### **Noise**

Development throughout Vandenberg AFB, including oak ridge tracking facility upgrades, entry control facilities security upgrades, and reactivation of SLC-4E, would result in intermittent, short-term noise impacts throughout the region. The duration of these localized impacts would be limited to the construction phases of the individual projects.

Future construction activities occurring within the region would be subject to the standard measures and conditions regulating construction activities to ensure consistency with OSHA noise standards and guidelines. The contribution of Alternative A (proposed action) or Alternative B to incremental short-term construction impacts would not be cumulatively significant, as these activities would be temporary and intermittent. Impacts associated with generating noise at cumulative project sites during construction periods, in combination with construction of Alternative A or Alternative B would not result in significant cumulative impacts, as such impacts are generally localized and confined to the immediate construction area.

Noise generated by annual maintenance activities would be consistent with the existing uses in the project area and would not substantially differ from the existing noise environment within the project vicinity. Therefore, the contribution of Alternative A or Alternative B to cumulative operational noise impacts would not be adverse.

### **Public Health and Safety**

Alternative A (proposed action) or Alternative B along with other related projects proposed at Vandenberg AFB (e.g., reactivation of SLC-4E, borrow pits expansion and reactivation project, and overhead electrical line, Feeder Line K project) could result in increased risks to public health and safety. Cumulative construction and operational activities occurring within the region would be subject to federal, state, and local guidelines regulating public health and safety and hazardous materials. Construction activities associated with Alternative A or Alternative B would occur at a military facility with limited public access. Impacts from these alternatives to public safety and environmental health would not be significant because the risks to demolition/construction workers, potentials for offsite dispersion of contaminants, and future exposure to residual onsite contamination would be minimal and likely confined to the immediate project site. Implementation of Alternative A or Alternative

B, in conjunction with development of reasonably foreseeable projects, would not result in any adverse cumulative impacts to public health and safety. Thus, there would be no significant impacts.

### **Transportation**

Cumulative project buildout on Vandenberg AFB would result in additional traffic volumes within the region. Cumulative project-related auto and truck traffic could utilize streets and intersections in the project vicinity, as well as those streets that would be used by project-related construction traffic (i.e., equipment and commuting workers). Cumulative projects would generate increased levels of vehicular activity that would increase traffic trips on the local roadway network. Alternative A (proposed action) or Alternative B would temporarily affect the local roadway network during project construction due to minor, short-term increases in truck and equipment traffic. However, anticipated traffic volumes during construction would be within the capacity of surrounding roadways and existing levels of service along these roadways would be adequate to accommodate proposed traffic increases during construction. Proposed annual maintenance activities would not substantially increase traffic entering the project site. Given the minimal, short-term increases in traffic, the contribution of Alternative A or Alternative B to cumulative traffic impacts would not be significant. As a result, the proposed action, combined with other cumulative projects, would not result in adverse cumulative impacts on transportation. Thus, there would be no significant impacts.

### **Visual Resources**

Cumulative impacts on visual resources could result from the combined incremental change in visual character, introduction of development visually incompatible with existing uses, and increased night lighting and glare resulting from probable future development at Vandenberg AFB. Implementation of Alternative A or Alternative B would not represent a substantial change

from its existing developed military character, and proposed development would be visually compatible with existing military activity in the project vicinity. As a result, Alternative A or Alternative B, combined with other cumulative projects, would not result in significant cumulative impacts on visual resources.

### **Water Resources**

Cumulative development within or adjacent to water bodies could result in temporary and localized effects to water quality. Implementation of Alternative A (proposed action) or Alternative B would not result in adverse impacts to water resources. Significant surface water and groundwater quality impacts would not occur as a result of construction-induced erosion or existing soil and/or groundwater contamination. In addition, Alternative A or Alternative B would not result in increased flooding potential onsite or offsite. Less than significant impacts resulting from these alternatives, when added

to the impacts from the other related and cumulative projects, would not result in associated adverse cumulative impacts.

In summary, Vandenberg AFB includes environmental contract specifications and environmental protection measures into all projects to ensure that no adverse cumulative impacts result from development projects. Projects are reviewed and modified, as necessary, during the NEPA planning process to ensure adverse impacts are avoided or minimized to the extent feasible. As all Vandenberg AFB projects are designed and implemented in compliance with applicable statutes and regulations and environmental protection measures are developed in coordination with the appropriate regulatory agencies, impacts associated with Alternative A (proposed action) or Alternative B, when added to the impacts from other related and cumulative projects, would not result in significant cumulative impacts.



**This page intentionally left blank.**

## Chapter 5. List of Preparers

Crabtree, Chris, Senior Air Quality Scientist, SAIC

B.A., 1978, Environmental Studies, University of California, Santa Barbara

Years of Experience: 32

Degner, Jessica, Project Manager/Environmental Planner, SAIC

B.A. 2002, Environmental Studies, University of California at Santa Barbara

Years of Experience: 9

Foster, Karen, NEPA Project Manager/Cultural Resources Manager, SAIC

Ph.D. 1998, Anthropology, University of California, Santa Barbara

M.A. 1993, Anthropology, University of California, Santa Barbara

B.A. 1989, Anthropology, University of California, Irvine

Years of Experience: 20

Lebow, Clayton, Vice President/Senior Archaeologist, Applied EarthWorks, Inc.

M.A. 1982, Archaeology, Cultural Anthropology & Geography, Oregon State University, Corvallis

B.S. 1977, Forest Engineering, Oregon State University, Corvallis

Years of Experience: 31

Pattison, A. Trevor, Program Manager, SAIC

B.S. 1999, Geological Sciences-Earth Systems, University of California at Santa Barbara

Years of Experience: 13

Wadsworth, Gregory, Production Manager, SAIC

B.A. 2006, Music Composition, Westmont College

Years of Experience: 6

Woods, Christopher, GIS Manager, SAIC

B.A. 1997, Geography, University of Western Ontario

Years of Experience: 13

**This page intentionally left blank.**

## Chapter 6. List of Agencies, Organizations, and Persons Contacted

California Coastal Commission, Federal Consistency Review, San Francisco, CA

California Native Plant Society, Los Osos, CA

California Regional Water Quality Control Board, Central Coast Region, San Luis Obispo, CA

California State Historic Preservation Officer, Sacramento, CA

Environmental Defense Center, Santa Barbara, CA

La Purisima Audubon Society, Lompoc, CA

Lompoc Public Library, Lompoc, CA

Santa Barbara County Air Pollution Control District, Project Review, Santa Barbara, CA

Santa Barbara Museum of Natural History, Santa Barbara, CA

Santa Barbara Public Library, Santa Barbara, CA

Santa Maria Public Library, Santa Maria, CA

Santa Ynez Band of Chumash Indians, Tribal Elders Council, Santa Ynez, CA

University of California, Library, Santa Barbara, CA

United States Fish and Wildlife Service, Ventura Field Office, Ventura, CA

Vandenberg Air Force Base Library, Vandenberg AFB, CA

**This page intentionally left blank.**

## Chapter 7. References

- Alterman, I.B., R.B. McMullen, L.S. Cluff, and D.B. Slemmons (eds). 1994. Seismotectonics of Central California Coast Ranges. Geological Society of America Special Paper 292.
- Arnold, Jeanne E. 1992. Complex Hunter-Gatherer-Fishers of Prehistoric California: Chiefs, Specialists, and Maritime Adaptations of the Channel Islands. *American Antiquity* 57:60–84.
- Arnold, R.A. 1983. Ecological studies of six endangered butterflies (Lepidoptera: Lycaenidae): island biogeography, patch dynamics, and the design of habitat preserves. Univ. of Calif. Publ. in Entomology. 99:1-161.
- \_\_\_\_\_. 1981. A review of endangered species legislation in the USA and preliminary research on 6 endangered California butterflies. Beih. Veroff. Naturschutz. Landschaftspflege Bad.-Wurt. 21: 79-96.
- \_\_\_\_\_. 1978. Status of six endangered California butterflies, 1977. California Dept. of Fish & Game, Nongame Wildlife Investigations #-1-1, Study V, Job 2.20. Sacramento, CA. 95 pp.
- Berry, Sarah Hebbard. 1989. Memo for Record: Archaeological Monitoring near Building 398. Memorandum dated 2 March 1989, on file, 30 CES/CEVPC, Vandenberg Air Force Base, California.
- Bulger, J.B., N.J. Scott, and R.B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coasta forest and grasslands. *Biological Conservation* 110(1):85-95.
- California EPA (Environmental Protection Agency). 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March. Website: [http://www.climatechange.ca.gov/research/2008\\_assessment/index.html](http://www.climatechange.ca.gov/research/2008_assessment/index.html).
- Caltrans (California Department of Transportation). 2008. Noise Study Report Format Guidance Document. February.
- CARB (California Air Resources Board). 2011. iADAM Air Quality Data Statistics. Website: <http://www.arb.ca.gov/adam>.
- \_\_\_\_\_. 2010a. *Ambient Air Quality Standards (AAQS)*. Website: <http://www.arb.ca.gov/research/aaqs/aaqs.htm>.
- \_\_\_\_\_. 2010b. *Area Designations Maps/State and National*. Website: <http://www.arb.ca.gov/desig/adm/adm.htm>.
- \_\_\_\_\_. 2006a. Off-Road Emissions Inventory Program. OFFROAD2007. Website: <http://www.arb.ca.gov/msei/offroad/offroad.htm>.
- \_\_\_\_\_. 2006b. EMFAC2007 Release. Website: [http://www.arb.ca.gov/msei/onroad/latest\\_version.htm](http://www.arb.ca.gov/msei/onroad/latest_version.htm).

- Carbone, Larry A., and Roger D. Mason. 1998. Phase I, II, and III Archaeological Surveys for Cultural Resources Inventory, Vandenberg Air Force Base, Santa Barbara County, California. Science Applications International Corporation and Chambers Group, Inc., Santa Barbara, California. Submitted to U.S. Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco.
- CDMG (California Division of Mines and Geology). 1999. *Fault Rupture Hazard Zones in California*. Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps. Special Publication 42. Sacramento, CA.
- \_\_\_\_\_. 1994. Fault Activity Map of California and Adjacent Areas, with Locations and Ages of Recent Volcanic Eruptions, compiled by C.W. Jennings.
- Craig, Steven, and Michael A. Glassow. 1978. An Archaeological Survey and Statement of Significance for Cultural Resources Located in the Vicinity of Oil Well Canyon, Vandenberg Air Force Base, California. Office of Public Archaeology, University of California, Santa Barbara. Submitted to the Heritage Conservation and Recreation Service, Interagency Archeological Services Branch, San Francisco.
- Crisologo, R. S. 1981. Environmental Surveillance Report, No. 7, TOR 019, March 16, 1981 to June 15, 1981. The Ralph M. Parsons Company, Pasadena, California. Submitted to Martin Marietta Corporation. Contract No. VV8-940018.
- Dibblee, T.W. 1988. Geologic Map of the Tranquillon Mountains and Point Arguello Quadrangles Santa Barbara County, California. Dibblee Geological Foundation Map #DF-19.
- \_\_\_\_\_. 1950. Geology of Southwestern Santa Barbara County, California: Point Arguello, Lompoc, Point Conception, Los Olivos, and Gaviota Quadrangles. California Division of Mines Bulletin 150. California Department of Natural Resources, San Francisco.
- Doyle, Kevin T., Amy Graham, Ayse Taskiran, and Susan L. Bupp. 1996. *Cultural Resources Investigations of Site CA-SBA-647, Point Arguello Coast Guard Reservation, California*. Tetra Tech, Inc., San Bernardino, California. Submitted to the U.S. Coast Guard, Oakland, California, Contract No. DTCG88-93-D-6AL023.
- Enright, Erin A., and Clayton G. Lebow. 2011. *Archaeological Studies in Support of the N1, N3, and N6 Feeder Lines, Vandenberg Air Force Base, Santa Barbara County, California*. In preparation. Applied EarthWorks, Inc., Lompoc, California. Submitted to the 30 CES/CEANC, Vandenberg Air Force Base, California.
- Environmental Solutions, Inc. 1990a. *Space Transportation System Natural Gas Pipeline and SLC-4 Security Fence Treatment Programs, Vandenberg Air Force Base, Santa Barbara County, California*. Environmental Solutions, Inc., Irvine, California. Submitted to U.S. Air Force, Headquarters Space Systems Division, Department of Environmental Planning, El Segundo, California.
- \_\_\_\_\_. 1990b. *Test Excavations at Nine Prehistoric Archaeological Sites for the Backbone Fiber Optic Transmission System Project, Vandenberg Air Force Base, Santa Barbara County, California*. Environmental Solutions, Inc., Irvine, California. Submitted to U.S. Air



- Force, Headquarters Space Systems Division, Department of Environmental Planning, El Segundo, California.
- \_\_\_\_\_. 1990c. *The Survey and Inventory of Historic Properties within the Titan IV/Centaur Launch Complex Study Area, Vandenberg Air Force Base, Santa Barbara County, California, vol. I*. Environmental Solutions, Inc., Irvine, California. Submitted to U.S. Air Force, Headquarters Space Systems Division, Department of Environmental Planning, El Segundo, California.
- \_\_\_\_\_. 1990d. *The Testing and Evaluation of Five Archaeological Sites for the Space Launch Complex 4 Power System Upgrade Project, Vandenberg Air Force Base, Santa Barbara County, California*. Technical Report, vol. 1. Environmental Solutions, Inc., Irvine, California. Prepared for Martin Marietta Corporation, Vandenberg Air Force Base. Submitted to U.S. Air Force, Headquarters Space Systems Division, Department of Environmental Planning, El Segundo, California.
- \_\_\_\_\_. 1989. *Cultural Resources Inventory: Supplement to the Draft Environmental Impact Statement for the Proposed Construction/Operation of Space Launch Complex 7, Vandenberg Air Force Base, California*. Environmental Solutions, Inc., Irvine, California. Submitted to Martin Marietta Aerospace.
- Environmental Solutions, Chester D. King, Robert O. Gibson, and Lynn H. Gamble. 1988. *Research Design and Treatment Plan for Historic Properties Affected by Space Launch Complex 4 Security Fence Line and Associated Security Systems, Vandenberg Air Force Base, California*. Environmental Solutions, Inc., Irvine, California. Submitted to Martin Marietta Aerospace.
- Erlandson, Jon M. 1994. *Early Hunter-Gatherers of the California Coast*. Plenum, New York.
- Erlandson, Jon M., and Kevin Bartoy. 1996. Protohistoric California: Paradise or Pandemic? *Proceedings of the Society for California Archaeology* 9:304–309.
- \_\_\_\_\_. 1995. Cabrillo, the Chumash, and Old World Diseases. *Journal of California and Great Basin Anthropology* 17:153–173.
- Ferraro, David O., Kathleen Ann Bergin, Jerry D. Moore, Sandra Day-Moriarty, and Jeffry A. Parsons. 1988. *Survey, Testing, and Evaluation of Fourteen Sites for the STS Power Plant No. 6 Natural Gas Pipeline Project, Santa Barbara County, California*. Harmsworth Associates Research Report No. 4. Harmsworth Associates, Laguna Hills, California. Submitted to Martin Marietta Corporation, Vandenberg Air Force Base, California.
- FHWA (Federal Highway Administration). 2006. *Highway Traffic Noise in the United States. Problem and Response*. U.S. Department of Transportation. April.
- Gerber, Joyce L., and Phyllisa J. Eisentraut. 1994. *Results of Archaeological Survey and Testing in Conjunction with the California Commercial Spaceport Project, South Vandenberg Air Force Base, California*. Dames & Moore, Santa Barbara, California. Prepared for California Commercial Spaceport, Inc.
- Gibson, Robert O. 1986. *Results of Archaeological Monitoring and Limited Subsurface Testing for the V-23 Space Shuttle Launch Site, Patrol Roads C and D, Vandenberg Air Force*

- Base, California. Robert O. Gibson, Archaeologist, Paso Robles, California. Submitted to Harmsworth Associates, Laguna Hills, California.
- \_\_\_\_\_. 1985. Results of Archaeological Testing at SBA-212 and SBA-1145, Vandenberg Air Force Base, California. Robert O. Gibson, Archaeologist, Paso Robles, California. Submitted to Harmsworth Associates, Laguna Hills, California.
- \_\_\_\_\_. 1983. Results of Archaeological Monitoring of Utility Trenches Associated with the N2 Plant, South Vandenberg Air Force Base, Santa Barbara County, California. On file, 30 CES/CEVPC, Vandenberg Air Force Base, California.
- Glassow, Michael A. 1996. *Purisimeño Chumash Prehistory: Maritime Adaptations along the Southern California Coast*. Case Studies in Archaeology. Jeffrey Quilter, series editor. Harcourt Brace College Publishers, San Diego.
- \_\_\_\_\_. 1990. *Archaeological Investigations on Vandenberg Air Force Base in Connection with the Development of Space Transportation System Facilities*, with contributions by Jeanne E. Arnold, G. A. Batchelder, Richard T. Fitzgerald, Brian K. Glenn, D. A. Guthrie, Donald L. Johnson, and Phillip L. Walker. Department of Anthropology, University of California, Santa Barbara. Submitted to U.S. Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco, Contract No. CX-8099-2-0004.
- \_\_\_\_\_. 1981. *Preliminary Report, Archaeological Data Recovery Program in Relation to Space Shuttle Development, Vandenberg Air Force Base, California*. Office of Public Archaeology, University of California, Santa Barbara.
- Glassow, Michael A., Jeanne E. Arnold, George A. Batchelder, Richard T. Fitzgerald, Brian K. Glenn, D. A. Guthrie, Donald L. Johnson, and Phillip L. Walker. 1981. *Final Report: Archaeological Data Recovery Program in Relation to Space Shuttle Development, Vandenberg Air Force Base, California*. Office of Public Archaeology, University of California, Santa Barbara.
- Glassow, Michael A., and M. Kornfeld. 1981. *Archaeological Test Excavations at Sites in the Vicinity of Oil Well Canyon Vandenberg Air Force Base, California*. Social Process Research Institute, University of California, Santa Barbara.
- Glassow, Michael A., Laurence W. Spanne, and Jeffrey Quilter. 1976. Evaluation of Archaeological Sites on Vandenberg Air Force Base, Santa Barbara County, California. Department of Anthropology, University of California, Santa Barbara. Submitted to the U.S. Department of the Interior, National Park Service, Office of Archaeology, San Francisco, Contract No. CX800040020.
- Greenwood, Roberta S. 1978. Obispeño and Purisimeño Chumash. In California, edited by Robert F. Heizer, pp. 520–523. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- \_\_\_\_\_. 1972. 9000 Years of Prehistory at Diablo Canyon, San Luis Obispo County, California. San Luis Obispo County Archaeological Society Occasional Paper No. 7.

- Harro, Douglas R., and Joyce L. Gerber. 1999. *Archaeological Investigations for the Proposed Boeing Elevated Platform Transporter Turnaround Pad, Vandenberg Air Force Base, Santa Barbara County, California*. Applied EarthWorks, Inc., Lompoc, California. Prepared for ENSR, Camarillo, California.
- Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007 – Synthesis Report*. IPCC Fourth Assessment Report.
- Jennings, C.W. 1994. Fault map of California and adjacent areas. California Division of Mines and Geology. California Geological Data Map Series, Map No. 6, Scale 1:750,000.
- King, Chester D. 1990. Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804. The Evolution of North American Indians, edited by David Hurst Thomas. Garland, New York.
- \_\_\_\_\_. 1984. *Ethnohistoric Background*. In *Archaeological Investigations on the San Antonio Terrace, Vandenberg Air Force Base, California, in Connection with MX Facilities Construction*, pp. I-1–I-54. Chambers Consultants and Planners, Stanton, California. Submitted to U.S. Army Corps of Engineers, Los Angeles District, Contract No. DAC09-81-C-0048.
- \_\_\_\_\_. 1981. *The Evolution of Chumash Society: A Comparative Study of Artifacts Used in Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.
- Landberg, Leif. 1965. The Chumash Indians of Southern California. Southwest Museum Papers No. 19. Los Angeles.
- Lebow, Clayton G. 2001. *Archaeological Studies for the Encapsulated Payload Transfer Route, Vandenberg Air Force Base, Santa Barbara County, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30 CES/CEVPC, Vandenberg Air Force Base, California.
- Lebow, Clayton G., Dina M. Coleman, Joan George, M. Colleen Hamilton, Ann M. Munns, and Rebecca L. McKim. 2003. *Archaeological Studies for the SLC-4 to SLC-6 Waterline Replacement Project, Vandenberg Air Force Base, Santa Barbara, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to Vandenberg AFB, California.
- Lebow, Clayton G., Douglas R. Harro, Rebecca L. McKim, and Carole Denardo. 2001. *Archaeological Excavations at CA-SBA-246, An Early Holocene Site on Vandenberg Air Force Base, Santa Barbara County, California*. Applied EarthWorks, Inc., Fresno, California, for Tetra Tech, Inc., Santa Barbara, California. Submitted to 30 CES/CEV, Vandenberg Air Force Base, California, USAF Contract No. F04684-95-C-0045.
- Lebow, Clayton G., Leeann Haslouer, Jason M. Fancher, Nathan E. Stevens, and Ann M. Munns. 2005. *Archaeological Investigations Supporting Consultation with the State Historic Preservation Officer for the Heritage Launch Program Demolition on Vandenberg Air Force Base in Santa Barbara County, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30 CES/CEVPC, Vandenberg Air Force Base, California, Contract No. T0900DF415.

- Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, and Ann M. Munns. 2006. *Prehistoric Land Use in the Casmalia Hills throughout the Holocene: Archaeological Investigations along Combar Road, Vandenberg Air Force Base, California*. 2 vols. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEVNC), Vandenberg Air Force Base, California.
- Lebow, Clayton G., and Dina M. Ryan. 2006. *Archaeological Survey of the Coastline and Lower Drainages, Vandenberg Air Force Base, Santa Barbara County, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to the 30 CES/CEVPC, Vandenberg Air Force Base.
- Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, Ann M. Munns, and Carole Denardo. 2007. *Littoral Adaptations throughout the Holocene: Archaeological Investigations at the Honda Beach Site (CA-SBA-530), Vandenberg Air Force Base, Santa Barbara County, California*. 2 vols. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEVNC), Vandenberg Air Force Base, California.
- Lebow, Clayton G., Rebecca L. McKim, Leeann G. Haslouer, and Ann M. Munns. 2009. *Archaeological Investigations at CA-SBA-1119 on South Vandenberg Air Force Base, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight, Cultural Resources Section (30 CES/CEVNC), Vandenberg Air Force Base, California.
- Maschner, Herbert D. G., Paul D. Friedman, and Pandora E. Snethkamp. 1991. *Phase 2 Investigations at Site CA-SBA-1145, Vandenberg Air Force Base, California*. On file, 30 CES/CEVPC, Vandenberg Air Force Base, California.
- Mattoni, R.H.T. 1992. The endangered El Segundo blue butterfly. *Journal of Research Lepidoptera* vol. 29. 277-304pp.
- Moratto, Michael J. 1984. *California Archaeology*. Academic Press, New York and London.
- Moratto, Michael J., Clayton G. Lebow, Erin A. Enright, Robert R. Peterson Jr., Leeann Haslouer, and Ann M. Munns. 2009. *Archaeological Investigations in 2008–2009 for the CONS-Firebreaks and Access Roads, Vandenberg Air Force Base, Santa Barbara County, California*. Applied Earthworks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight, Cultural Resources Section (30 CES/CEVNC), Vandenberg Air Force Base, California.
- Moore, Jerry D., Kathleen Ann Bergin, David D. Ferraro, Jeffry A. Parsons, Lois Roberts, Robert O. Gibson, Sandra Day-Moriarty, and Clay Singer. 1988. *The Testing and Evaluation of Fourteen Archaeological Sites on South Vandenberg Air Force Base, Santa Barbara County, California*. Harmsworth Associates Research Report No. 3. Harmsworth Associates, Laguna Hills, California. Submitted to Martin Marietta Corporation, Vandenberg Air Force Base, California.
- National Cooperative Highway Research Program. 1999. *Mitigation of Nighttime Construction Noise, Vibrations, and Other Nuisances*. Cliff J. Schexnayder, Ph.D., PE and James Ernzen, Ph.D., PE. Arizona State University.

- National Oceanic and Atmospheric Administration. 2011. Period of Record Monthly Climate Summary – Lompoc, California (045064). Period of Record: July 1, 1950 to December 31, 2005. Website: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?calomp+sca>.
- Nettles, Wendy M., and M. Colleen Hamilton. 2008. *The Honda Section House: Data Recovery at CA-SBA-1145/H, Vandenberg Air Force Base, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight, Cultural Resources Section (30 CES/CEVNC), Vandenberg Air Force Base, California.
- Nowlan, Patrick, Sheila Ellsworth, Roy McCullough, Mira Metzinger, Jim Gorski, and Andy Bonhert. 1996. *Cold War Properties Evaluation—Phase I, Inventory and Evaluation of Launch Complexes and Related Facilities at Vandenberg Air Force Base, California, for the United States Air Force*. Tri-Services Cultural Resources Research Center, U.S. Army Construction Engineering Research Laboratories, Champaign, Illinois. Prepared for U.S. Department of Defense Legacy Resource Management Program, Washington, D.C.
- Palmer, Kevin (Lex). 1999. *Central Coast Continuum—From Ranchos to Rockets: A Contextual Historic Overview of Vandenberg Air Force Base, Santa Barbara County, California*. Prepared by Palmer Archaeology and Architecture Associates, Santa Barbara.
- Peterson, Bob, and Christopher Ryan. 2011. Identification of Historic Properties and Assessment of Adverse Effects: N1, N3, N6 Feeder Lines Replacement Project, Vandenberg Air Force Base, Santa Barbara County, California. 30 CES/CEANC, Vandenberg Air Force Base, California. Submitted to the State Historic Preservation Officer, Sacramento, California.
- Pratt, G.F. and G.R. Ballmer. 1993. Correlations of diapause intensities of *Euphilotes* spp. and *Philotiella speciosa* (Lepidoptera:Lycaenidae) with host bloom period and elevation. *Ann. Ent. Soc.* 86: 265-272.
- Preston, William. 1996. Serpent in Eden: Dispersal of Foreign Diseases into Pre-Mission California. *Journal of California and Great Basin Anthropology* 18:2–37.
- Price, Barry. 1995. *Archaeological Records Search and Overview of Key Cultural Resources Issues, Alliant EELV/LCLS Project at Space Launch Complex 6, Vandenberg Air Force Base, California*. Prepared by Applied EarthWorks, Inc., Fresno, California. For Reynolds, Smith and Hills, Inc., Jacksonville, Florida.
- Rudolph, Teresa P. 1984. *Lithic Procurement and Manufacturing Sequences at SBA-1542, Vandenberg Air Force Base, California*. Office of Public Archaeology, Social Process Research Institute, University of California, Santa Barbara. Submitted to U.S. Department of the Interior, National Park Service, Interagency Archeological Services Division, San Francisco.
- Santa Barbara County Air Pollution Control District. 2011. 2009 Annual Air Quality Report. Website: <http://www.sbcapcd.org/sbc/2009aqrpt.htm>.
- Schilz, Allan J. 1985. *Archaeological Survey, Testing, and Evaluation: STS Power Plant No. 6 Natural Gas Pipeline, Vandenberg Air Force Base, Santa Barbara County, California*.

- WESTEC Services, Inc., San Diego, California. Submitted to U.S. Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco. Purchase Order No. PX 8000-5-0087.
- Schmidt, James J., and Kathleen Ann Bergin. 1990. *The Testing and Evaluation of Five Archaeological Sites for the Space Launch Complex 4 Power System Upgrade Project, Vandenberg Air Force Base, Santa Barbara County, California*. Technical Report, vol. 1. Environmental Solutions, Inc., Irvine, California. Prepared for Martin Marietta Corporation, Vandenberg Air Force Base, California.
- Serena, Jeffery B. 1981. *Archaeological Salvage Excavations for V-33 (External Tank Processing and Storage Facility), Vandenberg Air Force Base, Santa Barbara County, California*. Office of Public Archaeology, University of California, Santa Barbara. Submitted to U.S. Department of the Interior, National Park Service, Interagency Archeological Services, San Francisco.
- Snethkamp, Pandora E., and Ann Munns. 1991. *Relocation of U.S. Sprint Standby and Regenerator Building: Results of Phase I Survey and Phase Ia Backhoe Testing, Vandenberg Air Force Base, California*. On file, 30 CES/CEVPC, Vandenberg Air Force Base, California.
- Spanne, Laurence W. (Larry). 1984. *Draft Final Report on Subsurface testing at Archaeological Site CA-SBA-1686; GSSI Station Set Location V-33; Vandenberg AFB, Santa Barbara County California*. VTN Consolidated, Inc., Irvine, California. Letter report to Ralph M. Parsons Company, Pasadena, California.
- . 1982. Inventory of Archaeological Materials Collected by VTN Monitors at Archaeological Sites Sba 1678 and 1686 during Construction at Space Transportation System Station Scts V-31 and V-33. In Environmental Surveillance Report, No. 10, TOR 022, December 16, 1981 through March 15, 1982, by R. S. Crisologo. The Ralph M. Parsons Company, Pasadena, California. Submitted to Martin Marietta Corporation, Contract No. VV8-940018.
- . 1980. *An Archaeological Evaluation of a Cable Trench at CA-SBa-670 and CA-SBa-1144 Honda Canyon, Vandenberg Air Force Base, Santa Barbara County, California*. VTN Consolidated, Inc., Irvine, California. Prepared for the Ralph M. Parsons Company, Pasadena, California.
- Spanne, Laurence W., and Michael A. Glassow. 1974. Air Force Space Transportation System, Vandenberg AFB, Santa Barbara County, California, Testing and Evaluation of Archaeological Sites: A Preliminary Report. University of California, Santa Barbara.
- Stone, David F., and Lynn H. Gamble. 1981. Cultural Resources Evaluation, U.S. Coast Guard Station, Point Arguello, California, vol. I. Office of Public Archaeology, University of California, Santa Barbara. Submitted to the Heritage Conservation and Recreation Service, Interagency Archeological Services, San Francisco, Contract No. A52009(80).
- Stone, David F., and Michael A. Glassow. 1980. Analysis of a Telephone Cable Trench, SBA-670, SBA-1144, Vandenberg Air Force Base, Santa Barbara County, California. Submitted to 30 CES/CEVPC, Vandenberg Air Force Base, California.

- Thorson, P.H., J.K. Francine, E.A. Berg, L.E. Fillmore, and D.A. Eidson. 2001. Acoustic Measurement of the 21 September 2000 Titan II G-13 Launch and Quantitative Analysis of Behavioral Responses for Selected Pinnipeds on Vandenberg Air Force Base, CA. SRS Technologies technical report submitted to USAF and NMFS. 29pp.
- USAF (United States Air Force). 1987. Mineral resource management plan: Potential exploration, development, and production of oil and gas resources, Vandenberg Air Force Base.
- USEPA (U.S. Environmental Protection Agency). 2010. Region 9 Air Programs – Air Quality Maps. Website: <http://www.epa.gov/region09/air/maps>.
- \_\_\_\_\_. 1995. Compilation of Air Pollutant Emission Factors, AP-42, Volume I. Section 13.2.3, Heavy Construction Operations. Website: <http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf>.
- USFWS (U.S. Fish and Wildlife Service). 2011. Biological Opinion for Replacment of Three Electrical Distribution Lines on South Vandenberg Air Force Base, Santa Barbara County, California (8-8-11-F-16). May 4.
- Vandenberg Air Force Base (AFB). 2011. Integrated Natural Resources Management Plan: 2010-2014.
- \_\_\_\_\_. 2010. Biological Assessment: Potential Effects to Beach layia, California red-legged frog, El Segundo blue butterfly and Gaviota tarplant. Repair/Replace Overhead Distribution Lines N1/N3/N6 of Electrical Infrastructure at Vandenberg Air Force Base, Santa Barbara County, California. Prepared by 30th Space Wing Asset Management Flight, 30 CES/CEAN. November.
- \_\_\_\_\_. 2009. Vandenberg Air Force Base General Plan. Section 7 (Land Use and Transportation). 54pp.



**This page intentionally left blank.**

# Appendix A

---

Air Quality Emissions Calculations

**This page intentionally left blank.**

**Appendix A - Air Emission Calculations for Repairs/Replacement of Electrical Lines N1, N3, and N6 on VAFB.**

Table A-1. Equipment Usage Data for Repairs/Replacement of Electrical Lines N1 and N3 on VAFB.

Table A-2. Equipment Usage Data for Repairs/Replacement of Electrical Line N6 on VAFB.

Table A-3. Air Emission Factors for Repairs/Replacement of Electrical Lines N1, N3, and N6 on VAFB.

Table A-4. Annual Emissions from Repairs/Replacement of Electrical Lines N1 and N3 on VAFB.

Table A-5. Annual Emissions from Repairs/Replacement of Electrical Line N6 on VAFB.

[illegible]

[illegible]

[illegible]



	V	W	X	Y	Z	AA	AB	AC
1	<b>Table A-4. Annual Emissions from Repairs/Replacement of Electrical Lines N1 and N3 on VAFB.</b>							
2		<i>Tons per Year</i>						
3	<i>Location/Equipment Type</i>	<i>VOC</i>	<i>CO</i>	<i>NOx</i>	<i>SOx</i>	<i>PM10</i>	<i>PM2.5</i>	<i>CO2</i>
4	<i>Establish Old Access Roads</i>							
5	Bulldozer - D6	0.00	0.01	0.01	0.00	0.00	0.00	0.80
6	Loader - 2 CY	0.00	0.00	0.00	0.00	0.00	0.00	0.45
7	Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.20
8	Fugitive Dust					0.08	0.01	
9	<b>Subtotal</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.08</b>	<b>0.01</b>	<b>1.45</b>
10	<i>Construct New Access Roads</i>							
11	Bulldozer - D6	0.00	0.00	0.01	0.00	0.00	0.00	0.55
12	Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.36
13	Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.13
14	Fugitive Dust					0.04	0.00	
15	<b>Subtotal</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>1.05</b>
16	<i>Haul New Line Poles</i>							
17	Flat Bed Truck	0.00	0.00	0.02	0.00	0.00	0.00	0.00
18	<i>Erect New Line Poles</i>							
19	Heavy Line Truck	0.00	0.01	0.03	0.00	0.00	0.00	0.00
20	Boom/Crane Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	<b>Subtotal</b>	<b>0.00</b>	<b>0.01</b>	<b>0.03</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
22	<i>Install Conductors</i>							
23	Bucket/Truck	0.00	0.01	0.02	0.00	0.00	0.00	0.00
24	Heavy Line Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
25	Boom/Crane Truck	0.01	0.02	0.06	0.00	0.00	0.00	5.71
26	3 Drum Sock Line Puller	0.00	0.01	0.01	0.00	0.00	0.00	1.22
27	Bull Wheel Puller	0.00	0.01	0.02	0.00	0.00	0.00	2.07
28	Static Truck/Tensioner	0.00	0.01	0.02	0.00	0.00	0.00	0.00
29	Backhoe/Loader	0.01	0.05	0.07	0.00	0.01	0.01	6.43
30	Flat Bed Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
31	<b>Subtotal</b>	<b>0.03</b>	<b>0.09</b>	<b>0.22</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>15.44</b>
32	<i>Remove Existing Conductor</i>							
33	Bucket Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	Boom/Crane Truck	0.00	0.01	0.02	0.00	0.00	0.00	2.25
35	Bull Wheel Puller	0.00	0.01	0.04	0.00	0.00	0.00	4.64
36	Static Truck/Tensioner	0.00	0.00	0.01	0.00	0.00	0.00	0.00
37	<b>Subtotal</b>	<b>0.01</b>	<b>0.02</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.90</b>
38	<i>Remove Existing Wood Poles</i>							
39	Bucket Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
40	Boom/Crane Truck	0.00	0.01	0.02	0.00	0.00	0.00	2.25
41	Auger/Line Truck w/Compressor	0.00	0.01	0.04	0.00	0.00	0.00	3.98
42	Flat Bed Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
43	Dump Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
44	Backhoe/Loader	0.00	0.01	0.02	0.00	0.00	0.00	1.90
45	<b>Subtotal</b>	<b>0.01</b>	<b>0.04</b>	<b>0.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>8.13</b>
46	<b>Total Emissions - N1 and N3</b>	<b>0.05</b>	<b>0.18</b>	<b>0.46</b>	<b>0.00</b>	<b>0.14</b>	<b>0.03</b>	<b>32.97</b>

	V	W	X	Y	Z	AA	AB	AC
49	<b>Table A-5. Annual Emissions from Repairs/Replacement of Electrical Line N6 on VAFB.</b>							
50		<i>Tons per Year</i>						
51	<i>Location/Equipment Type</i>	<i>VOC</i>	<i>CO</i>	<i>NOx</i>	<i>SOx</i>	<i>PM10</i>	<i>PM2.5</i>	<i>CO2</i>
52	<i>Establish Old Access Roads</i>							
53	Bulldozer - D6	0.01	0.04	0.06	0.00	0.01	0.00	5.09
54	Loader - 2 CY	0.01	0.02	0.03	0.00	0.00	0.00	2.85
55	Water Truck	0.00	0.00	0.01	0.00	0.00	0.00	1.26
56	Fugitive Dust					0.50	0.05	
57	<b>Subtotal</b>	<b>0.01</b>	<b>0.06</b>	<b>0.10</b>	<b>0.00</b>	<b>0.51</b>	<b>0.06</b>	<b>9.21</b>
58	<i>Construct New Access Roads</i>							
59	Bulldozer - D6	0.01	0.04	0.07	0.00	0.00	0.00	6.88
60	Grader	0.01	0.03	0.05	0.00	0.00	0.00	4.55
61	Water Truck	0.00	0.01	0.02	0.00	0.00	0.00	1.66
62	Fugitive Dust					0.44	0.04	
63	<b>Subtotal</b>	<b>0.02</b>	<b>0.08</b>	<b>0.13</b>	<b>0.00</b>	<b>0.45</b>	<b>0.05</b>	<b>13.09</b>
64	<i>Haul New Line Poles</i>							
65	Flat Bed Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
66	<i>Erect New Line Poles</i>							
67	Heavy Line Truck	0.00	0.01	0.02	0.00	0.00	0.00	0.00
68	Boom/Crane Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69	<b>Subtotal</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
70	<i>Install Conductors</i>							
71	Bucket/Truck	0.00	0.01	0.02	0.00	0.00	0.00	0.00
72	Heavy Line Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
73	Boom/Crane Truck	0.00	0.01	0.04	0.00	0.00	0.00	4.33
74	3 Drum Sock Line Puller	0.00	0.01	0.01	0.00	0.00	0.00	0.88
75	Bull Wheel Puller	0.00	0.00	0.01	0.00	0.00	0.00	1.49
76	Static Truck/Tensioner	0.00	0.01	0.02	0.00	0.00	0.00	0.00
77	Backhoe/Loader	0.01	0.03	0.06	0.00	0.00	0.00	4.87
78	Flat Bed Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
79	<b>Subtotal</b>	<b>0.02</b>	<b>0.07</b>	<b>0.16</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>11.57</b>
80	<i>Remove Existing Conductor</i>							
81	Bucket Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Boom/Crane Truck	0.00	0.01	0.03	0.00	0.00	0.00	2.60
83	Bull Wheel Puller	0.00	0.02	0.05	0.00	0.00	0.00	5.36
84	Static Truck/Tensioner	0.00	0.00	0.01	0.00	0.00	0.00	0.00
85	<b>Subtotal</b>	<b>0.01</b>	<b>0.03</b>	<b>0.08</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>7.96</b>
86	<i>Remove Existing Wood Poles</i>							
87	Bucket Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
88	Boom/Crane Truck	0.00	0.01	0.03	0.00	0.00	0.00	2.60
89	Auger/Line Truck w/Compressor	0.00	0.01	0.04	0.00	0.00	0.00	4.59
90	Flat Bed Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
91	Dump Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00
92	Backhoe/Loader	0.00	0.02	0.03	0.00	0.00	0.00	2.19
93	<b>Subtotal</b>	<b>0.01</b>	<b>0.04</b>	<b>0.12</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>9.38</b>
94	<b>Total Emissions - N6</b>	<b>0.07</b>	<b>0.28</b>	<b>0.63</b>	<b>0.00</b>	<b>0.97</b>	<b>0.12</b>	<b>51.21</b>
95	<b>Total Project Emissions</b>	<b>0.12</b>	<b>0.47</b>	<b>1.10</b>	<b>0.00</b>	<b>1.11</b>	<b>0.16</b>	<b>84.17</b>